



# **ESI Site Health and Safety Plan (HASP)**

## **For:**

**Camp Minden M6 Destruction**  
Camp Minden  
1600 Java Road  
Minden, Louisiana 71055-7924

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## **ESI Site Health and Safety Plan (HASP)**

### **1.0 Introduction**

This ESI Health and Safety Plan is developed using the format and guidance specified in USEPA Publication 9285.1-03, PB92 – 963414, Standard Operating Safety Guides, June 1992. ESI will conduct thermal destruction of approximately 16 million pounds of M6 and CBI at Camp Minden, LA for the Louisiana Military Department (LMD) in compliance with Occupational Safety and Health Agency (OSHA) Environmental Protection Agency (USEPA), Department of Defense (DOD), Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), Louisiana State Police-LSP, Louisiana Department of Environmental Quality-LDEQ and Camp Minden rules and regulations. This Health and Safety Plan establishes and describes the framework and elements for conducting ESI health and safety policy compliance on the thermal destruction of approximately 16 million pounds of M6 and CBI currently stored in approximately 90 magazines on Camp Minden owned by the LMD.

### **2.0 ESI Health and Safety Policy**

ESI was established in 1987 and now has over 27 years of successful experience in explosives demolition, disposal, structural removal, and marine salvage. As such, Health and Safety is a top priority for ESI to protect workers, the public, and our mission. The ESI health and safety goal is to conduct safe and efficient explosives work and complete our explosives mission safely. Our goal and tolerance is for “zero” accidents on every ESI project we manage and every project we conduct.

ESI will conduct thermal destruction service operations at Camp Minden, LA for the LMD in compliance with Occupational Safety and Health Agency (OSHA), Environmental Protection Agency (USEPA), Department of Defense (DOD), Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), LMD, LDEQ and Camp Minden rules and regulations. The general overall policy for ESI ammunition and explosives (A&E) operations is to employ the “cardinal rule of explosives safety”- limit exposure to a minimum number of personnel, for a minimum amount of time, to a minimum amount of A&E consistent with safe and efficient operations IAW DOD 4145.26-M, C.3.2.1.

### **3.0 ESI Health and Safety Management**

ESI understands employee and public health and safety are the highest priority on this project. As such, the ESI Health & Safety Manager reports directly to the ESI Project Manager. The ESI organizational structure for this project is shown in the chart below.

The ESI Health & Safety Manager will advise the ESI Project Manager on all aspects of safety and health for the material removal and disposal project. The ESI Health & Safety Manager for this project will have experience and knowledge in ammunition and ordnance operations, as well as experience in OSHA industrial and construction safety regulations. The ESI Health and

Safety Manager will have direct experience working in explosives safety with specific direct experience in explosives material removal and disposal operations through various propellant burn technologies, such as the Contained Burn Chamber. The ESI Health and Safety Manager will have project authority and responsibility for monitoring and implementing the ESI Site Health and Safety Plan throughout the performance of this material removal and disposal project.

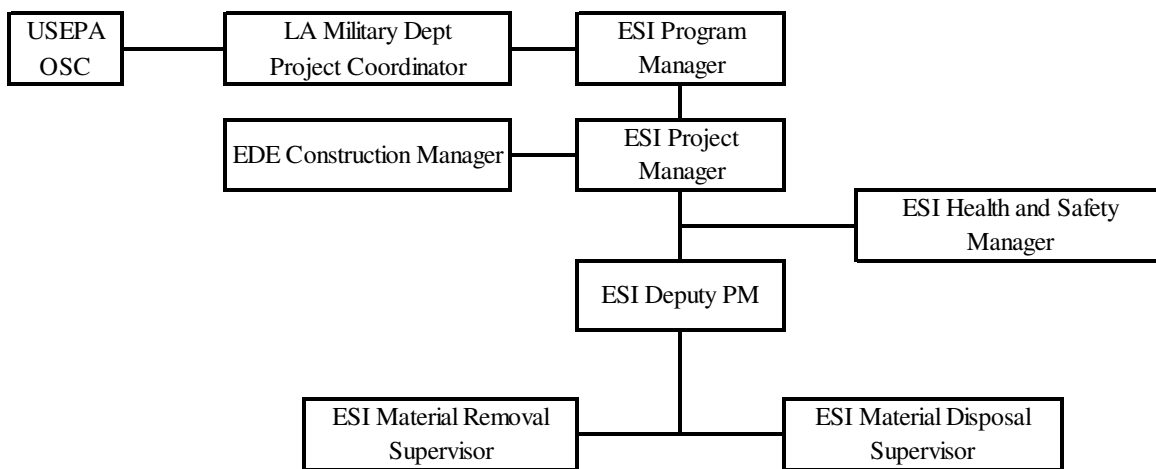


Figure 1 ESI Site Organization and Lines of Authority

Our ESI Health & Safety Manager will develop close working relationships and good communications with the LMD Safety Office and the EPA OSC to insure our policies and procedures are in conformance with and meet health and safety requirements.

Functions of the ESI Health and Safety Manager on this project will include:

- Advising ESI management on all health and safety aspects of this project,
- Developing and fostering daily working relationships and communication with LMD and EPA personnel and organizations,
- Providing daily, weekly, and other periodic ESI health and safety reports as required,
- Developing and maintaining the ESI operational hazard analyses,
- Developing and maintaining the ESI explosives safety site plan,
- Developing, conducting, and documenting ESI employee health and safety training (initial, refresher, toolbox, new employee, and visitor),
- Developing and maintaining ESI Standard Operating Procedures (SOPs),
- Conducting and documenting health and safety inspections of ESI operations (magazine entry, material removal, transportation, staging, handling, and disposal)
- Leading initial magazine safe entry inspections (using checklist, temperature gun, and oxygen meter),
- Developing and maintaining the ESI Magazine Prioritization Plan,
- Maintaining Material Safety Data Sheets for any ESI hazardous chemicals on site,

- Justifying and procuring health and safety Personal Protective Equipment (PPE) required for ESI operations,
- Justifying and procuring health and safety equipment/tools required for ESI operations,
- Certifying inert materials and magazines as clean and inert throughout the project,
- Developing and maintaining ESI emergency response plan/procedures,
- Monitoring severe weather conditions and advising Project Manager on ESI operation shutdown and personnel evacuation,
- Supporting external Health and Safety organizational visits or inspections,
- Maintaining the ESI Health and Safety Program files,
- Reporting and conducting ESI mishap/incident/accident investigations if/as required.

#### **4.0 Site Specific Health and Safety Plan (HASP).**

The ESI HASP will be carried out in three phases:

- Phase 1 - Mobilization and Site Preparation;
- Phase 2 – Removal and Disposal Operations; and,
- Phase 3 – Site Restoration and Demobilization.

The critical health and safety elements which will be conducted during the three project phases are as shown in Appendix A and further described below.

##### **4.1. Phase 1 (Mobilization and Site Preparation):**

The initial phase will cover mobilization and site preparation for all activities to be completed at the site. Plans and procedures pertaining to health and safety will be developed, submitted and finalized during this phase as follows:

- ESI submission of ESI Health and Safety Plan to LMD and USEPA for review. Incorporation of review comments will finalize the HASP document for ESI implementation.
- Develop and submit ESI Explosives Site Plan IAW DOD 4145.26-M, C1.8 to LMD for review and approval.
- Develop Standard Operating Procedures (SOPs) for material removal and transportation IAW DOD 4145.26-M, C3.3.
- Develop SOPs for material disposal/burning IAW DOD 4145.26-M, C3.3 and C15.9.
- Develop SOPs for public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717.
- Develop SOPs for severe weather/lightning warning, evacuation, and shutdown for ESI operations IAW DOD 4145.26-M, C6.3.
- Develop SOPs for site remediation/restoration IAW DOD 4145.26-M, C3.3, USEPA, LDEQ and LMD requirements.

- Develop hazard analysis for material removal and transportation IAW DOD 4145.26-M, C11.
- Develop hazard analysis for material disposal/burning IAW DOD 4145.26-M, C11.
- Coordinate with Camp Minden Fire Department and Security and develop ESI emergency response plan IAW DOD 4145.26-M, C3.3.1 and C3.3.4.
- Provide initial safety training on site specific safety and health hazards to ESI personnel IAW DOD 4145.26-M, C3.3.3.
- Procure Personal Protective Equipment (PPE) for ESI operators and site visitors IAW DOD 4145.26-M, C3.11.
- Procure appropriate safety tools for ESI operators IAW DOD 4145.26-M, C3.9.
- Monitor site construction of the Contained Burn Chamber with Pollution Control Equipment, Material Staging Area, Remote Control Center, Aqueous Ammonia Tank, Thermal Initiator/Thermal Booster Magazine, and Diesel/Gas Storage for proper quantity distance application IAW DOD 4145.26-M, C5.0, as well as general construction safety.
- Submit periodic health and safety program status reports on progress to the LMD.

#### **4.2. Phase 2 (Removal and Disposal Operations)**

Phase 2 moves from mobilization and preparation into removal and disposal of all material to be addressed under this project. This phase will be the longest phase and will include all aspects of material handling and material disposal. Specific action items pertaining to site health and safety covered under this phase are as follows:

- Conduct operational start-up safety briefing/training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Monitor ESI operations for health and safety issues IAW DOD 4145.26-M, C.1.7.3.
- Monitor burn tray temperature (< 228 F) for re-loading trays IAW DOD 4145.26-M, C15.9.8.
- Perform safety certification of inert material for packing and disposal IAW DOD 4160.28-M, V3, C6.0. The current plan is to conduct a 200% visual inspection of M6 and CBI packaging and certify the packaging inert by a 3<sup>rd</sup> independent quality control sample plan. Monitor ESI operations for compliance with SOPs.
- Monitor severe weather/lightning warnings for potential temporary evacuation and shutdown of ESI operations IAW DOD 4145.26-M, C6.3.
- Monitor for proper use of PPE by ESI operators IAW DOD 4145.26-M, C3.11.
- Monitor for proper use of appropriate safety tools by ESI operators IAW DOD 4145.26-M, C3.9.
- Conduct periodic health and safety training to all ESI employees IAW DOD 4145.26-M, C3.3.3.

- Perform safety certification of inert magazines as emptied and cleaned up IAW DOD 4160.28-M, V3, C6.0.
- Provide safety briefings, PPE, and escort to visitors at ESI operations IAW DOD 4145.26-M, C3.3.3.
- Submit periodic health and safety program status reports on progress to LMD.
- Conduct emergency drills, in conjunction with Camp Minden Fire Department, at ESI operations as required.
- Report and investigate any ESI incidents IAW DOD 4145.26-M, C2.0.
- Support any external organization (OSHA, USEPA, DOD, BATFE, LSP, LDEQ, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.

#### **4.3. Phase 3 (Site Restoration and Demobilization)**

Phase 3 is initiated immediately upon final confirmation and approval by LMD of the completion of the removal and destruction of the propellant and igniter material. At this point the Contained Burn Chamber is no longer required and is scheduled to be dismantled and removed. Specific action items pertaining to site health and safety covered under this phase are as follows:

- Conduct restoration health and safety briefing/training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Monitor ESI restoration operations for health and safety issues IAW DOD 4145.26-M, C.1.7.3.
- Perform safety inert certification of all Contained Burn Chamber equipment and material for packing, removal, and/or disposal IAW DOD 4160.28-M, V3, C6.0.
- Monitor ESI restoration operations for compliance with SOPs.
- Monitor severe weather/lightning warnings for potential temporary evacuation and shutdown of ESI operations IAW DOD 4145.26-M, C6.3.
- Monitor for proper use of PPE by ESI operators IAW DOD 4145.26-M, C3.11.
- Monitor for proper use of appropriate safety tools by ESI operators IAW DOD 4145.26-M, C3.9.
- Conduct periodic health and safety training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Perform safety certification of magazines as emptied, inert, and cleaned up IAW DOD 4160.28-M, V3, C6.0.
- Perform safety inert certification of all Contained Burn Chamber equipment, materials, and surrounding soil in Burn Area I as adequately cleaned up IAW DOD 4160.28-M, V3, C6.0.

- Provide safety briefings, PPE, and escort to visitors at ESI operations IAW DOD 4145.26-M, C3.3.3.
- Report and investigate any ESI mishap IAW DOD 4145.26-M, C2.0.
- Support any external organization (OSHA, USEPA, LSP, LDEQ, DOD, BATFE, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.
- Submit periodic health and safety program status reports on progress to LMD.

## **5.0 Personnel Training.**

ESI provides a comprehensive training program to all employees whose work entails potential exposure to toxic chemicals or hazardous environments. The program is designed to promote safe work practices under hazardous environmental conditions, as well as under general construction conditions. ESI utilizes in-house experts, and each training program is supervised by ESI's technical experts. These experts have extensive experience in the field of hazardous waste management and college degrees in environmental and science fields and/or technical certification.

All ESI on-site personnel will receive initial and refresher (at least monthly) health and safety training which covers specific health and safety hazards (A&E, heat stress, fatigue, driving, material handling, PPE, SOPs, confined space entry, lockout/tag out, local insects and animals, severe weather, emergency procedures, etc.) associated with the material removal, transportation, disposal, and restoration operations.

ESI personnel who will be participating in on-site operations will have the following training and certifications:

- Personnel handling explosives will be licensed by Louisiana State Police as Explosives Handlers (8 hour course).
- Personnel responsible for initiating burns will have Louisiana State Police Explosive Blaster's license (16 hour course).
- DOD 4145.26-M - DOD Contractor's Safety Manual For Ammunition and Explosives\*
- DOD 5100.76 - Safeguarding Sensitive Conventional Arms, Ammunition, and Explosives (AA&E)\*
- LAC Title 55 Chapter 15 – Public Safety – Explosives Code\*
- 49 CFR 172 Subpart A Through Subpart G – USDOT HAZMAT for purposes of transportation \*
- 27 CFR Part 555 - Bureau of Alcohol, Tobacco, Firearms, and Explosives - Commerce in Explosives\*
- LAC Title 33 Part V – Hazardous Waste - \*\*



- 29 CFR 1910 – OSHA Occupational Safety and Health Standards\*\*
- 29 CFR 1910. 146 Confined Space Entry training for entry into either the Contained Burn Chamber and Pollution Control Equipment\*\*
- 29 CFR 1910.147 Lock-Out/Tag-Out training for work on either the Contained Burn Chamber and Pollution Control Equipment\*\*
- Personnel operating forklifts and heavy equipment will have the appropriate licenses and certifications to operate the specified equipment (29CFR part 1926).
- Emergency contact information is provided in Appendix F. ESI personnel will be trained on emergency contact and response procedures.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 4, Subject: Restricted Access, dated 10 Sep 14.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 7, Subject: Fire Hydrants, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 8, Subject: Camp Minden Badging Procedure, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 9, Subject: Explosive Operations, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 11, Subject: Foreign Visitor Access Policy, dated 26 Jan 05.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 14, Subject: Explosive Safety Restrictions, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 18, Subject: Severe Weather, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 20, Subject: Energetics Incidence Reporting Requirements, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 23, Subject: Explosive Safety, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 29, Subject: Railroad Safety Policy, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 34, Subject: Testing and/or Burning Activities, dated 1 Jan 15.\*\*
- ESI personnel will be trained on and comply with LMD Policy Number 35, Subject: Emergency Response, dated 1 Jan 15.\*\*

\*This training will be done by ESI Health & Safety Officer as part of a 16-hour course.

\*\*This training will be done by ESI Health & Safety Officer as part of an 8-hour course.

Additional on-site training, such as confined space entry, lock-out/tag-out, severe weather hazards, first aid, heat stress, cold exposure, emergency response, hot work permit process, smoking policy, company dress and demeanor policy, safe vehicle operations, fire extinguisher use, and site biological hazards, will be covered in daily safety tool box meetings.

All ESI on-site management personnel currently have extensive training and experience conducting material removal and disposal operations. The ESI Health and Safety Manager will maintain a file of every ESI employee's training records.

## **6.0 Site Control**

The general overall policy for ESI destruction operations will be employing the "cardinal rule of explosives safety", which is to limit exposure to a minimum number of personnel, for a minimum amount of time, to a minimum amount of A&E consistent with safe and efficient operations IAW DOD 4145.26-M, C3.2.1.

ESI will develop and submit an Explosives Site Plan IAW DOD 4145.26-M, C1.8 to the LMD for review and approval IAW LMD Policy Number 9, Subject: Explosive Operations, dated 1 Jan 15 and LMD Policy Number 23, Subject: Explosive Safety, dated 1 Jan 15. A portion of the Explosives Site Plan will address the hazard areas and safety zones which will be established and enforced during ESI A&E operations and material burning to protect both workers and the public. Internal and external safety distances will be used in Area I as shown on Maps in Appendix B and described below.

- This 1250' safety zone is Inhabited Building Distance based on a worst case maximum of 880# Hazard Division (HD) 1.1 and is used to protect unrelated personnel and the public. The Contained Burn Chamber will be operated on a 24 hours a day basis to meet throughput requirements, so the 1250' safety zone will be in place on a continuous basis.
- The Material Staging Area will be sited using existing Area I barricades based on a worst case maximum of 90,000# HD 1.1 and an Inhabited Building Distance safety zone of 1,793' will be used for protection of unrelated personnel and the public as required by DOD 4145.26-M, Table AP2.T1.
- Internal safety distances for protection of ESI unrelated personnel are 1,793' for the Range Control Facility based on Inhabited Building Distance from the Material Staging Area with explosives limit of 90,000# HD 1.1 IAW DOD 4145.26-M, Table AP2.T1. During burns in the Contained Burn Chamber, the Remote Control Center and other related ESI personnel will be at least 231' based on remote operator protection for burns of up to 880# HD 1.1 in the Controlled Burn Chamber IAW DOD 4145.26-M, C5.18.5.1. The Material Staging Area will be at least 403' from the Contained Burn

Chamber based on Barricaded Intraline Distance for 90,000# HD 1.1 at the Material Staging Area as required by DOD 4145.26-M, AP2.T5.

- Explosives magazines will be used to store the thermal initiators (HD 1.4) and thermal boosters (HD 1.3). **NO** HD 1.1 explosives will be stored by ESI. These explosives magazines will be limited to 500# HD 1.3 materials and a 50' Intraline distance is applied to the Material Staging Area IAW DOD 4145.26-M, Table AP2.T14.
- Gas and diesel fuel storage tanks will be required to support material handling equipment and will be located 100' based on fire protection distance from the Material Staging Area and at least 231' from the Contained Burn Chamber IAW DOD 4145.26-M, C3.12.1. and C5.18.5.1.
- A 10,000 gallon aboveground Ammonium Hydroxide (Aqueous Ammonia) storage tank will be required to support the Contained Burn Chamber pollution control equipment. The controlling distance for siting this tank will be 231' based on protecting the operator refilling the tank from an accidental explosion of the Contained Burn Chamber while concurrently burning 880# HD 1.1 IAW DOD 4145.26-M, C5.18.5.1.

Additionally, the following precautions will be taken and maintained throughout project activities.

- ESI does not anticipate any smoke or noise from burning material in the Contained Burn Chamber, however ESI will keep LMD closely informed of daily burning operations IAW LMD Policy Number 34, Subject: Testing and/or Burning Activities, dated 1 Jan 15, until the Contained Burn Chamber burning operations are well established and proven.
- ESI has established a road closure policy on installation roadways to prevent access into the hazard areas during burns and from an accidental explosion to protect the public and any unrelated personnel during material staging and burning operations. Use of Area I for burn operations will not impact any established installation roadways and will minimally impact any contractors working on Camp Minden. The ESI Range Control Facility will be located off the road accessing Area I and outside the 1,793' hazard area where all incoming traffic and visitors to Area I will report and be access controlled.
- ESI will establish a 1250' safety zone and evacuate all personnel from the hazard area prior to conducting burning operations for the Contained Burn Chamber. The Contained Burn Chamber will be operated on a 24 hours a day basis to meet throughput requirements, so the 1250' safety zone will be in place on a continuous basis. A 1,793' safety zone will be established and maintained to allow up to 90,000# HD 1.1 at the Staging Area.

- ESI operations for material removal, transportation, disposal/burning, and restoration will be strictly conducted using Standard Operating Procedures (SOPs) IAW DOD 4145.26-M, C3.3 and C15.9.
- All visitors to ESI operations will be provided safety briefings, PPE, and escort to ESI operations IAW DOD 4145.26-M, C3.3.3.
- ESI will support any external organization ( USEPA, LSP, LDEQ, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.
- The current plan is to conduct a 200% visual inspection of M6 and CBI packaging and certify the packaging inert by a 3<sup>rd</sup> independent quality control sample plan

### **7.0 Personal Protective Equipment (PPE).**

ESI will utilize Job Safety Analysis, as shown in Appendix C, for material removal, transportation, disposal, and restoration operations to identify PPE requirements as risk mitigation measures to reduce exposure to health and safety hazards IAW DOD 4145.26-M, C11. PPE requirements for ESI operators will be identified in SOPs for material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. ESI will procure and provide any PPE required protecting ESI operators from identified health and safety hazards during the material removal, transportation, disposal, and restoration operations IAW OSHA 1910 Subpart I.

ESI will use all 100% long sleeve cotton coveralls, cotton undergarments, hard hats (magazines only), safety glasses/face shields (specific tasks), steel toed shoes, leather gloves (specific tasks), dust masks (optional), and appropriate respirators for confined space entry in the Contained Burn Chamber for ESI personnel handling containers and materials and conducting material disposal operations. ESI will provide eyewashes (CBC, Pollution Control Equipment, and Staging Area) and wash stations and soap for all personnel to use. Proper personal hygiene such as washing hands and face prior to breaks, lunch, and end of day will required by ESI for all personnel working at this site.

### **8.0 Monitoring.**

ESI will conduct air monitoring of the material disposal/burning operations as described in the ESI Quality Assurance Project Plan (QAPP). ESI will address public health and safety issues concerning ESI operations as required and continue public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717 through LMD.

The ESI Health and Safety Manager will use an Oxygen/Carbon Monoxide meter and temperature gun to perform initial entry in each new Magazine prior to personnel entry for inspection or maintenance. ESI will use LP forklifts in magazines which are cleaner burning and

produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of the Contained Burn Chamber and will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented.

## **9.0 Medical Surveillance Program.**

Every ESI employee whose work entails potential exposure to hazardous materials or environments must take part in a comprehensive Medical Monitoring Program (MMP). Before assignment to a hazardous materials site, each ESI employee must complete a medical screening and surveillance examination. This information is used to establish the present medical status of the individual and can be used to assess possible future exposures in the work environment.

ESI has developed documented Job Safety Analysis (Appendix C) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C11. The Contained Burn Chamber and Pollution Control Equipment presents the additional potential risk of confined space entry and appropriate respirator use as PPE. ESI personnel assigned confined space entry duty will require respirator fit testing, training on respirator maintenance, cleaning, and use, and medical surveillance on ability to safely wear a respirator.

ESI will use PPE to minimize operator exposure to materials during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. ESI will provide eyewashes (CBC, Pollution Control Equipment, and Staging Area) and wash stations and will train operators on the proper use and importance of good personal hygiene practices prior to drinking, eating, and at the end of work shifts.

ESI will periodically monitor operators for any unusual health or safety issues. ESI will consider additional medical surveillance for employees if any causal factor for health and safety concerns is identified.

## **10.0 Heat Stress and Cold Exposure.**

ESI has developed documented Job Safety Analysis (Appendix C) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C11. ESI will educate and promote good hydration to prevent heat stress. PPE will be used to minimize operator heat stress and cold exposure during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. Periodic health and safety training will be conducted as environmental conditions dictate heat stress and cold exposure will be training topics IAW DOD 4145.26-M, C3.3.3. ESI will

utilize OSHA guides and literature on preventing heat stress and cold exposure in training ESI employees.

### **11.0 Decontamination.**

ESI has developed documented Job Safety Analysis (Appendix C) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations, which may require personnel decontamination IAW DOD 4145.26-M, C11. ESI will use PPE to minimize operator exposure to materials and the requirement for decontamination during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. ESI will provide eyewashes (CBC, Pollution Control Equipment, and Staging Area) and wash stations and will train operators on the proper use and importance of good personal hygiene practices prior to drinking, eating, and at the end of work shifts.

The Contained Burn Chamber presents the additional potential risk of confined space entry and appropriate respirator use as PPE. ESI personnel assigned confined space entry duty will require respirator fit testing, training on respirator maintenance, cleaning, and use, and medical surveillance on ability to safely wear a respirator.

Appendix D provides site-specific chemical hazard information in the form of Material Safety Data Sheets (MSDSs) for all hazardous materials present on-site.

Emergency decontamination procedures shall include the following:

- Another team member will render initial first aid and remove the individual from the immediate area of contamination.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- Eyes: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to assure thorough flushing. Call a Physician.
- Skin: Wash with soap and running water.
- Ingestion: Contact Physician immediately.
- Inhalation: Remove to fresh air. Treat any irritation symptomatically. Call a Physician.

ESI will periodically monitor operators for any unusual health or safety issues.

### **12.0 Material Handling.**

ESI's goal is to limit personnel exposure and handling of the material to the minimum amount possible. ESI personnel will be trained on and comply with LMD Policy Number 9, Subject: Explosive Operations, dated 1 Jan 15 and LMD Policy Number 23, Subject: Explosive Safety,

dated 1 Jan 15. Appropriate requirements of these LMD policies will be incorporated into ESI SOPs.

ESI has developed documented Job Safety Analysis (Appendix C) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M and OSHA 1910.10.

ESI will require use of proper material handling equipment during material removal, transportation, disposal, and restoration operations. ESI personnel operating material handling equipment will be trained and qualified for proper use of material handling equipment IAW OSHA 1910.176 and OSHA 1910.178.

ESI will use LP forklifts in magazines which are cleaner burning and produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of the Contained Burn Chamber and Pollution Control Equipment and will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented. All LP and diesel vehicles operating in the vicinity of explosives will be equipped with exhaust spark arrestors and have approved air cleaners IAW DOD 4145.26-M, C3.12.3.

### **13.0 Weather Monitoring.**

ESI will establish procedures to be incorporated into the existing LMD Severe Weather Monitoring and Warning System and comply with LMD Policy Number 18, Subject: Severe Weather, dated 1 Jan 15.

Additionally if permitted and desired, ESI will establish a system for monitoring the approach of electrical storms IAW DOD 4145.26-M, C3.7.1. The ESI Health and Safety Manager will be responsible for monitoring severe weather and advising the ESI Project Manager when to initiate safe shutdown and evacuation procedures. ESI will use local weather forecasts, lightning strike software, hand-held lightning warning meters, and visual observation for data on monitoring the approach of electrical storms and making decisions on operational shutdown and personnel evacuation. ESI will monitor for wind speed and direction to collect and assess environmental conditions related to daily burning operations. Use of a Contained Burn Chamber with pollution control equipment for burning material will eliminate the open burning requirement that no burning will take place when wind velocity exceeds 15 mph IAW DOD 4145.26-M, C15.9.3.3.

### **14.0 Confined Space Entry.**

The Contained Burn Chamber with Pollution Control Equipment presents the additional potential risk of confined space entry and ESI will incorporate the requirements of 29 CFR 1910.146 into

SOPs ensuring proper personnel training, use of a confined space entry permit, monitoring, medical surveillance, PPE, and recordkeeping for any personnel entry into the Contained Burn Chamber or Pollution Control Equipment.

ESI does not consider the Magazine as a confined space based on the open door and the top ventilator. The ESI Critical Inspection Team will inspect the top ventilator to make sure it is open before entry is permitted. The ESI Health and Safety Manager will use an oxygen meter and measure the oxygen level and temperature gun for initial magazine entry.

ESI will use LP forklifts in magazines which are cleaner burning and produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of either the Contained Burn Chamber or Pollution Control Equipment and will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented.

### **15.0 Emergency Response.**

ESI will incorporate and comply with LMD Policy Number 35, Subject: Emergency Response, dated 1 Jan 15. ESI will train ESI personnel on first aid and initial fire extinguisher use to handle initial response.

If a misfire occurs on or during a burn, the site will be evacuated for at least 30 minutes IAW DOD 4145.26-M, C15.9.3.6. ESI operators will implement misfire procedures before approaching the Contained Burn Chamber. The chamber door will be remotely opened to view the initiation circuit and any visible signs of the problem via the CCTV. Only two trained and qualified technicians shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection.

ESI will report any energetic incident IAW LMD Policy Number 20, Subject: Energetics Incident Reporting Requirements, dated 1 Jan 15.

### **16.0 Other Requirements and Safety Considerations.**

- The buddy system will be utilized at all times.
- All workers will attend the daily safety meeting before commencing work.
- Eating and drinking are strictly prohibited within Area I and at each storage magazine. Smoking is strictly prohibited in all magazine areas at the Camp Minden Site.



- Entry into and exit from Area I and magazines being worked will be restricted. Entry/exit of these zones must be made via the established and monitored access control points.
- Prescribed PPE must be worn as directed by the ESI Project Manager and ESI Health and Safety Manager. If the PPE is compromised in any way, it will be replaced immediately.
- Should any unusual situations occur operations will cease (all personnel will have “Stop Work Authority” in these situations) and the ESI Project Manager and ESI Health and Safety Manager will be contacted for further direction.
- The ESI Project Manager and ESI Health and Safety Manager will be informed when:
  - Adverse reactions or fires occur;
  - Lightning or thunder is detected;
  - Less than full crews are on site;
  - Visitors arrive;
  - Medical emergencies occur; and
  - Accidents or injuries occur on-site.
- Improperly grounded/guarded tools shall be tagged out-of-service and the ESI Supervisor shall be notified immediately. If a piece of equipment fails or is found to be in need of repair, it will be immediately tagged out-of-service and the ESI Supervisor shall be notified. This equipment will not be returned to service until repairs have been completed and the equipment tested by a competent individual.
- Unsafe conditions shall be reported immediately.
- Workers will minimize contact with hazardous materials by:
  - Avoiding areas of obvious contamination;
  - Using polyethylene sheeting to help contain contaminants; and
  - Avoiding contact with nitrocellulose or objects which contain nitrocellulose.
- Only essential personnel holding a Louisiana State Police, ESI explosive “Blaster” or “Handler” photo ID will be permitted in the work zones.
- Cellular phones will not be permitted while working in the magazines, material staging area or Area I burn site. Cell phones will be utilized by the ESI Project Manager, ESI Health and Safety Manager and other designated ESI employees (only when working outside the aforementioned areas).
- Radios will be utilized as primary means of communication between ESI managers, truck drivers, and key personnel. Radios will not be transmitted within 25 feet of unshielded or un-shunted electric thermal initiators as required by DOD 4145.26-M, C15.8.2.2.5.

- Air Horns – means of notification
  - One blast – attention all personnel
  - Two blasts – attention all personnel, leave the area
  - Three blasts – attention all personnel, “EMERGENCY SITUATION” leave the area immediately
- Hand signals will be utilized to instruct equipment operators in high noise environments. The following hand signals will be used:



- Indigenous hazardous insects, animals, and plants which may be encountered at the project site are shown in Appendix E. ESI personnel will be trained on recognition and first aid. A laminated sheet with pictures of indigenous hazardous insects, animals, and plants and first aid procedures will be prepared and placed in the ESI Team’s toolkit for reference.
- Emergency contact information is provided in Appendix F. ESI personnel will be trained on emergency contact and response procedures.

## 17.0 References

- a. DOD 4145.26-M, DOD Contractor's Safety Manual for Ammunition and Explosives, 13 March 2008.
- b. 29 CFR 1910, Occupational Safety and Health Administration (OSHA) General Industry Standards.
- c. USEPA Publication 9285.1-03, PB92 – 963414, Standard Operating Safety Guides, June 1992.
- d. DOD 4160.28-M, Volume 3, Defense Demilitarization: Procedural Guidance, 7 June 2011.
- e. DOD 5100.76-M, Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives (AA&E), 17 April 2012.
- f. LMD Policy Number 4, Subject: Restricted Access, dated 10 Sep 14.
- g. LMD Policy Number 7, Subject: Fire Hydrants, dated 1 Jan 15.
- h. LMD Policy Number 8, Subject: Camp Minden Badging Procedure, dated 1 Jan 15.
- i. LMD Policy Number 9, Subject: Explosive Operations, dated 1 Jan 15.
- j. LMD Policy Number 11, Subject: Foreign Visitor Access Policy, dated 26 Jan 05.
- k. LMD Policy Number 14, Subject: Explosive Safety Restrictions, dated 1 Jan 15.
- l. LMD Policy Number 18, Subject: Severe Weather, dated 1 Jan 15.
- m. LMD Policy Number 20, Subject: Energetics Incidence Reporting Requirements, dated 1 Jan 15.
- n. LMD Policy Number 23, Subject: Explosive Safety, dated 1 Jan 15.
- o. LMD Policy Number 29, Subject: Railroad Safety Requirements, dated 1 Jan 15.
- p. LMD Policy Number 34, Subject: Testing and/or Burning Activities, dated 1 Jan 15.
- q. LMD Policy Number 35, Subject: Emergency Response, dated 1 Jan 15.

## Appendix A

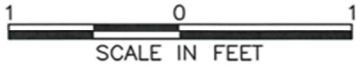
### Health and Safety Plan (HASP) - Key Events

<b>M6 Destruction Camp Minden Health and Safety Plan (HASP) Key Events</b>		
<b>Phase 1 (Mobilization and Site Preparation)</b>	<b>Phase 2 (Removal and Disposal Operations)</b>	<b>Phase 3 (Site Restoration and Demobilization)</b>
<p>Submit Health and Safety Plan for LMD/USEPA Review</p> <p>Finalize Job/Process Safety Analysis</p> <p>Monitor mobilization and site preparation operations</p> <p>Document safety inspections</p> <p>Prepare Explosives Site Plan</p> <p>Prepare SOPs for ESI material removal and disposal operations</p> <p>Provide safety training to ESI personnel</p> <p>Prepare ESI emergency response plan</p> <p>Conduct daily safety meeting for mobilization work</p> <p>Order personal protective equipment (PPE)</p> <p>Order required safety equipment (fire extinguishers, first aid kits, fire retardant blanket, thermal gun, CO monitor, Gatorade, etc.)</p> <p>Brief ESI Project Manager on safety program status</p> <p>Coordinate with Camp Minden Fire Department and Security on emergency response plan</p>	<p>Conduct daily safety brief to ESI personnel</p> <p>Monitor removal and disposal operations</p> <p>Perform safety certification of inert magazines</p> <p>Monitor safety certification of inert material for packing and disposal</p> <p>Document safety inspections</p> <p>Provide safety reports and status to ESI Site Manager</p> <p>Investigate and report ESI mishaps</p> <p>Address public information on safety as needed</p> <p>Monitor ESI supervisor and employee awareness</p> <p>Conduct periodic ESI safety training on pertinent safety topics</p> <p>Provide visitor safety briefings and escort services</p> <p>Conduct ESI emergency drill if needed</p> <p>Monitor adverse weather and advise ESI Site Manager</p> <p>Monitor burn tray temperature for re-loading Function as ESI POC for external safety visits</p>	<p>Prepare site restoration SOP</p> <p>Monitor site restoration operations</p> <p>Perform safety certification of clean-up operations</p> <p>Provide safety technical support on safety issues</p> <p>Address public information on safety as needed</p> <p>Provide safety reports and status to ESI Site Manager</p> <p>Provide visitor safety briefings and escort services</p>

## Appendix B

### Maps of Safety Zones and Safe Distances

**SITE LOCATION  
BOSSIER/WEBSTER  
PARISH**



**FIGURE 1  
SITE LOCATION MAP**

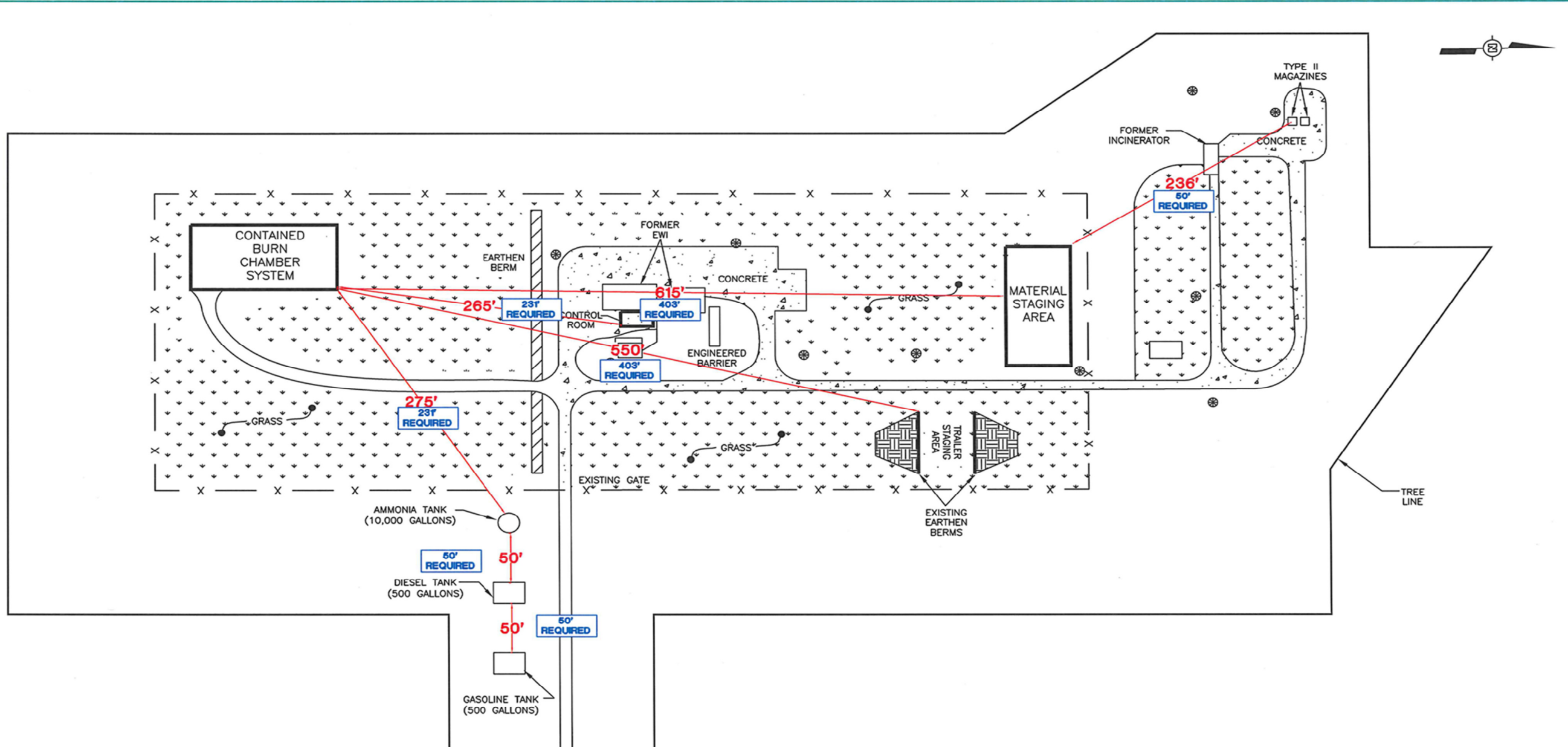
CAMP MINDEN – AREA I  
DISPOSAL SITE

PREPARED FOR:

**EXPLOSIVE SERVICE  
INTERNATIONAL**



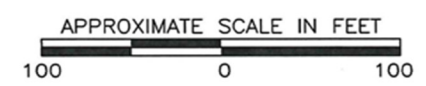
DRAWN BY	LDG	CHECKED BY	DRAWING #
	07/09/15	APPROVED BY	SITE LOC



**LEGEND**

EWI EXPLOSIVE WASTE INCINERATOR  
 ⊕ UTILITY POLE  
 — X — EXISTING PERIMETER FENCE  
 [Grass Pattern] GRASS WITHIN DISPOSAL SITE AREA

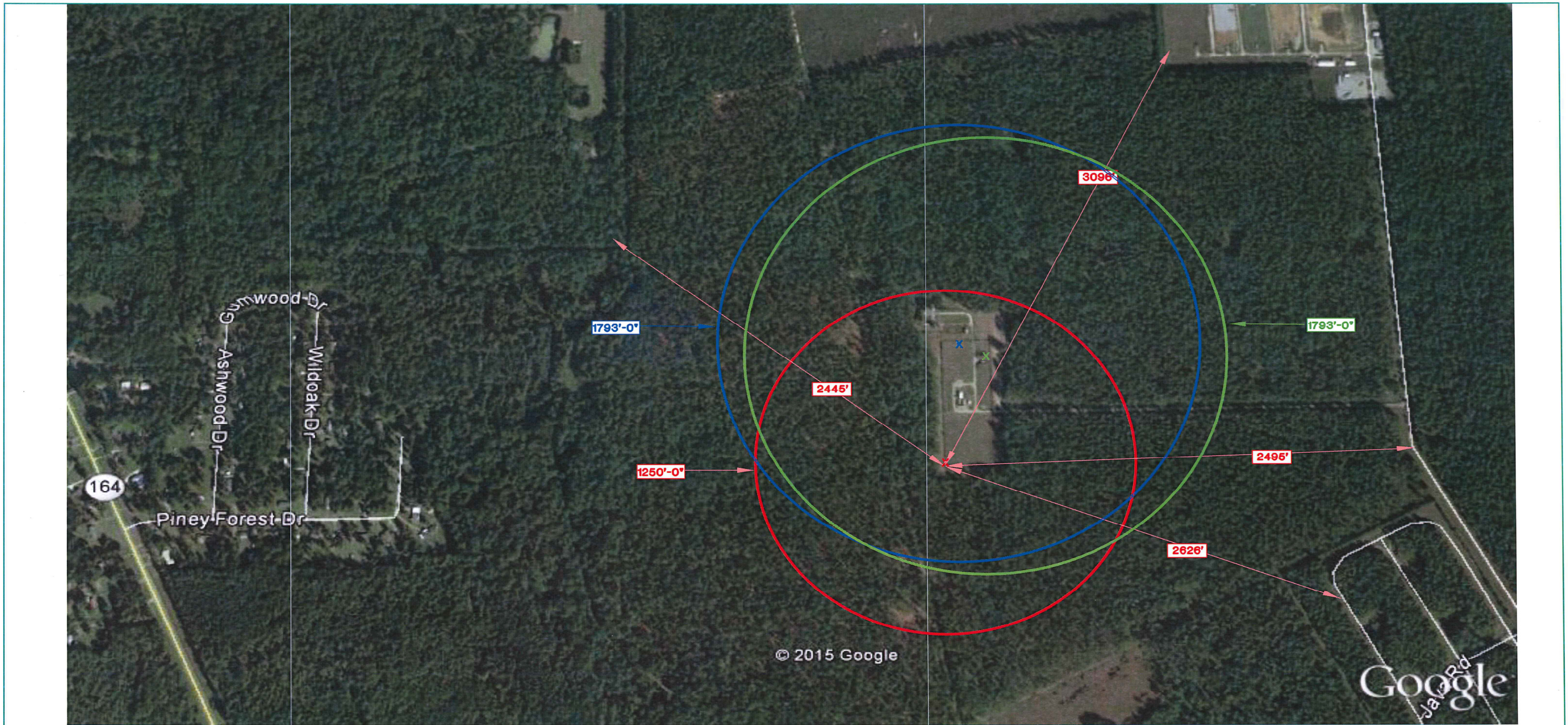
RED ACTUAL DISTANCE  
 BLUE REQUIRED DISTANCE



**FIGURE 3**  
**SITE INTRALINE DISTANCES**  
 CAMP MINDEN – AREA I DISPOSAL SITE  
 PREPARED FOR:  
**EXPLOSIVE SERVICE INTERNATIONAL**

DRAWN BY	LDG 07/09/15	CHECKED BY	DRAWING NO. 006
		APPROVED BY	





NOTE:

- 1) ARC IN RED FOR 1250 FOOT INHABITED BUILDING EXPLOSIVE SAFETY ARC. THE ARC IS FROM THE CONTAINED BURN CHAMBER SYSTEM AND IS BASED ON 880 LBS HAZARD DIVISION 1.1 MATERIAL.
- 2) ARC IN BLUE FOR 1793 FOOT INHABITED BUILDING EXPLOSIVE SAFETY ARC. THE ARC IS FROM THE MATERIAL STAGING AREA AND IS BASED ON 90,000 LBS HAZARD DIVISION 1.1 MATERIAL.
- 3) ARC IN GREEN FOR 1793 FOOT INHABITED BUILDING EXPLOSIVE SAFETY ARC. THE ARC IS FROM THE TRAILER STAGING AREA AND IS BASED ON 90,000 LBS HAZARD DIVISION 1.1 MATERIAL.

FIGURE 4

**INHABITED BUILDING SAFETY ARCS**

CAMP MINDEN – AREA I  
DISPOSAL SITE

PREPARED FOR:

**EXPLOSIVE SERVICE INTERNATIONAL**



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	07/09/15	APPROVED BY	008

Appendix C  
Job Safety Analysis Sheets

## Explosive Service International

### Job Safety Analysis

**Location:** Various Magazines – Camp Minden, LA

**Operation:** Remove Material from Magazines

**Revision/Date:** Revision 3 (klw) 14 Jun 2015

		Failure Probability				
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
Failure Severity	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

**Special Hazards:** Accidental Detonation, Forklift Impact, Material Fall/Drop, Personnel Fall, Personnel Strain, Animal/Insect, Heat/Cold

**Required and/or Recommended PPE:** 100% Cotton Coveralls, Hard Hat, Safety Glasses, Gloves, Steel-Toed Boots, & 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Open magazine door	Muscle Strain/ Caught Between Moving Parts	2 man rule, operator training on overexertion, competent operators, coverage in SOP for proper door opening, use of personal protective equipment (PPE), and use of tools or mechanical aids if required.	4

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Inspect propellant packaging and pallet for damage	Spilled Propellant/Explosion	Competent operators, coverage in SOPs for propellant packaging inspection, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	5
Position forklift for propellant pallet movement	Dropped Pallet/ Spilled Propellant/Explosion	2 man rule, licensed forklift operator, competent operators, coverage in SOP for propellant packaging inspection, operator training on propellant hazards, properly maintained forklift, and good housekeeping around forklift movement area.	10
Process or re-palletize spilled propellant, leaking containers, or broken pallets if required	Spilled Propellant/Explosion	2 man rule, competent operators, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, good housekeeping maintained around re-pack area, clear operator access and egress maintained around re-pack area, use of non-static/non-spark producing tools, and coverage in SOPs for propellant spills.	15

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Move propellant on pallet out of magazine	Dropped Pallet/Spilled Propellant/Explosion	2 man rule, licensed forklift operator, competent operators, coverage in SOPs for propellant movement, coverage in SOPs for propellant packaging inspection, coverage in SOPs for processing deteriorated propellant packaging, operator training on propellant hazards, strict control of heat producing devices around propellant, good housekeeping maintained around forklift movement area, clear operator access and egress maintained around forklift movement area, and coverage in SOPs for propellant spills.	10
Load propellant pallet on trailer	Dropped Pallet/ Spilled Propellant/Explosion	2 man rule, licensed forklift operator, properly maintained forklift, good roadway and trailer access, coverage in SOPs for trailer loading, operator training on propellant hazards, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	5
Close and lock magazine door	Muscle Strain/ Caught Between Moving Parts	2 man rule, operator training on overexertion, competent operators, packaging, coverage in SOP for proper door opening, use of personal protective equipment (PPE), and use of non-static/non-spark tools or mechanical aids.	4

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Locks and keys for magazines	Supervisor and operator training on key control process	Supervisor/safety check at end of day
LP Forklift	Licensed operator	Daily operator inspection and periodic safety inspection
Tractor/trailer	Licensed operator	Daily operator 626 inspection and periodic safety inspection

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, hard hat, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for tractor, forklift, and magazine	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material removal operations	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Packaging/pallets for re-packaging when required	Operator training on re-packaging procedures	Supervisor/safety check during daily monitoring
Non-static/non-spark tools for re-packaging propellant	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Orange Cones	Operator training on use to restrict traffic	Supervisor/safety check during daily monitoring
O2 and CO meter	Health and Safety Manager training on use	Initial entry and periodic monitoring inside magazine
Temperature Gun	Health and Safety Manager training on use	Initial entry and periodic monitoring inside magazine
Tape and plastic for container repair	Operator training on container repair	Supervisor/safety check during daily monitoring

**Notes:** During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

**Other Site Specific Hazards that Should Be Noted:** Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and

Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

**References/Policy:** DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

**Summary:** The greatest risk (15) is during processing of spilled or leaking material as the material will be in direct contact with operators and their tools. Repair or re-packaging of material will only be performed when packaging is already leaking or there is a high likelihood that the packaging will not contain the material during handling and transportation to the burning grounds. Heat/fire and human error are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, non-static/non-spark producing tools, portable fire extinguishers, and use of a 2 man rule to reduce probability of human error occurring.

**Personnel Attending JSA Training:**

_____	_____	_____
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## SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Magazines (Various)

Activity: Material Removal from Magazines

- a. The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:
  - (1) Reference OSHA 1910.109(c) (5) (ii): Packages of explosives shall not be unpacked or repacked in a magazine nor within 50 feet of a magazine or in close proximity to other explosives. Tools used for opening packages of explosives shall be constructed of non-sparking materials, except that metal slitters may be used for opening fiberboard boxes. A wood wedge and a fiber, rubber, or wood mallet shall be used for opening or closing wood packages of explosives. Opened packages of explosives shall be securely closed before being returned to a magazine.
  - (2) Reference OSHA 1910.109(c) (5) (iii): Magazines shall not be used for the storage of any metal tools nor any commodity except explosives.
  - (3) Reference OSHA 1910.109(c)(5)(iv): Magazine floors shall be regularly swept, kept clean, dry, free of grit, paper, empty used packages, and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from floors of magazines shall be properly disposed of.
  - (4) Reference OSHA 1910.109(c) (5) (vii): Smoking, matches, open flames, spark-producing devices, and firearms (except firearms carried by guards) shall not be permitted inside of or within 50 feet of magazines. The land surrounding a magazine shall be kept clear of all combustible materials for a distance of at least 50 feet. Combustible materials shall not be stored within 50 feet of magazines.
  - (5) Reference OSHA 1910.109(c) (5) (viii): Magazines shall be in the charge of a competent person at all times and who shall be held responsible for the enforcement of all safety precautions.
  - (6) Reference OSHA 1910.109 (c) (1) (ii): Blasting caps, electric blasting caps, detonating primers, and primed cartridges shall not be stored in the same magazine with other explosives.
  - (7) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
  - (8) Reference DOD 4145.26-M, C3.3.: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.



- (9) Reference DOD 4145.26M, C3.3.3.: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (10) Reference DOD 4145.26-M, C3.3.4.: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (11) Reference DOD 4145.26-M, C3.7.1.: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (12) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (13) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.
- (14) Reference DOD 4145.26-M, C3.12.1.: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (15) Reference DOD 4145.26-M, C3.12.3.: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (16) Reference DOD 4145.26-M, C9.2.3.: While crews are working inside magazines, doors shall remain open to permit rapid egress.
- (17) Reference DOD 4145.26-M, C9.4.2.: Damaged containers of AE should not be stored in a magazine with serviceable containers of AE. Such containers should be

repaired or the contents transferred to new or serviceable containers. All containers of AE in magazines shall be closed with covers securely fastened. Containers that have been opened shall be properly closed before restoring them. Stored containers should be free from loose dust and grit.

- (18) Reference DOD 4145.26-M, C9.4.3.: Do not permit loose powder, grains, powder dust, or particles of explosive substances from broken AE or explosive substance containers in magazines. In addition, clean up any spilled explosive substance as soon as possible following proper procedures established per section C8.4. and suspend all other work in the magazine until accomplished.
- (19) Reference DOD 4145.26-M, C10.2.1.: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (20) Reference DOD 4145.26-M, C10.3.: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (21) Reference DOD 4145.26-M, C10.4.: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (22) Reference DOD 4145.26-M, C10.5.: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (23) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d)(1)(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d)(1)(ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d)(1)(iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (24) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.

- (25) Reference OSHA 1910/178(l)(1)(i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).

## Explosive Service International

### Job Safety Analysis

**Location:** Various Magazines – Camp Minden, LA

**Operation:** Transport Material from Magazines to Area I Material Staging Area

**Revision/Date:** Revision 4 (klw) 14 Jun 2015

		Failure Probability				
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
Failure Severity	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

**Special Hazards:** Material Spill/Fire, Tractor/Trailer Accident, Forklift Impact, Material Fall/Drop, Personnel Fall, Personnel Strain, Animal/Insect, Heat/Cold

**Required and/or Recommended PPE:** 100% Cotton Coveralls, Safety Glasses, Gloves, Steel-Toed Boots, & 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Park tractor/trailer at Magazine	Tractor/trailer accident/fire	Licensed tractor operator, daily 626 vehicle inspection, wheel chocks, fire extinguishers on tractor, orange cones to block roadway, use of personal protective equipment (PPE), and use of tools or mechanical aids if required.	4
Tie-down/strap material containers on trailer	Muscle Strain/ Fall from Trailer	2 man rule, licensed tractor operator, operator training on overexertion, SOP on proper trailer loading, use of personal protective equipment (PPE), and use of non-static/non-spark tools or mechanical aids if required.	6

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Drive tractor with material load to Area I Material Staging Area	Vehicle Accident/Vehicle Fire/Spilled Propellant/Explosion	2 man rule, licensed tractor operator, remove wheel chocks, speed limit coverage in SOP, operator training on propellant hazards, fire extinguisher in tractor, properly maintained tractor, placarded tractor/trailer, and radio communication.	10
Drop material loaded trailer at Area I Material Staging Area and pick-up empty trailer	Vehicle Accident/Vehicle Fire/Spilled Propellant/Vegetation Fire/Explosion	2 man rule, licensed tractor operator, good housekeeping and vegetation control around Material Staging Area, place wheel chocks on trailer, Material Staging Area procedures in SOP, operator training on propellant hazards, fire extinguisher in tractor, properly maintained tractor, placarded trailer, remove placards on tractor and empty trailer, speed limit coverage in SOP, and radio communication.	10
Drive tractor with empty trailer back to magazine for loading with propellant	Vehicle Accident/Vehicle Fire	Licensed tractor operator, remove wheel chocks on empty trailer, remove placards on tractor and empty trailer, operator training on driving hazards, fire extinguisher in tractor, properly maintained tractor, speed limit coverage in SOP, and radio communication.	3

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Tractor/trailer	Licensed operator	Daily operator 626 inspection and periodic safety inspection
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for tractor	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Standard Operating Procedures (SOPs) for material transportation	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools for trailer operations	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Orange Cones	Operator training on use to restrict traffic	Supervisor/safety check during daily monitoring
Wheel chocks	Operator training on proper use	Supervisor/safety check during daily monitoring
Placards for tractor and trailer	Operator training on proper use	Supervisor/safety check during daily monitoring
Radio for communication	Operator training on proper use	Supervisor/safety check during daily monitoring
Tie-down straps	Operator training on proper use	Supervisor/safety check during daily monitoring

**Notes:** During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

**Other Site Specific Hazards that Should Be Noted:** Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

**References/Policy:** DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

**Summary:** The greatest risk (10) is during transportation and drop-off of the material loaded trailer at the Area I Material Staging Area. Heat/fire and human error are the greatest concerns for increasing the probability of an accidental initiation of the propellant. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, strict control of potential initiation sources, good housekeeping, speed

limits, placards, wheel chocks, tie-down straps, radio communication, non-static/non-spark tools, portable fire extinguishers, and use of a 2 man rule to reduce probability of human error and heat/fire occurring.

**Personnel Attending JSA Training:**


## SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Magazines (Various)

Activity: Transport Propellant from Magazines to Area I Material Staging Area

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

1. Reference OSHA 1910.109(d)(1)(i): No employee shall be allowed to smoke, carry matches or any other flame-producing device, or carry any firearms or loaded cartridges while in or near a motor vehicle transporting explosives; or drive, load, or unload such vehicle in a careless or reckless manner.
2. Reference OSHA 1910.109(d)(1)(iii): Explosives shall not be transferred from one vehicle to another within the confines of any jurisdiction (city, county, State, or other area) without informing the fire and police departments thereof. In the event of breakdown or collision the local fire and police departments shall be promptly notified to help safeguard such emergencies. Explosives shall be transferred from the disabled vehicle to another only, when proper and qualified supervision is provided.
3. Reference OSHA 1910.109(d)(1)(iv): Blasting caps or electric blasting caps shall not be transported over the highways on the same vehicles with other explosives, unless packaged, segregated, and transported in accordance with the Department of Transportation's Hazardous Materials Regulations (49 CFR parts 177-180).
4. Reference 1910.109(d)(2)(i): Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty and be in good mechanical condition. If vehicles do not have a closed body, the body shall be covered with a flameproof and moisture proof tarpaulin or other effective protection against moisture and sparks. All vehicles used for the transportation of explosives shall have tight floors and any exposed spark-producing metal on the inside of the body shall be covered with wood or other non-sparking materials to prevent contact with packages of explosives. Packages of explosives shall not be loaded above the sides of an open-body vehicle.
5. Reference OSHA 1910.109(d)(2)(ii)(a): Exterior markings or placards required on applicable vehicles shall be as follows for the various classes of commodities: Explosives A (Red letters on white background).
6. Reference OSHA 1910.109(d)(2)(ii)(c): Such markings or placards shall be displayed at the front, rear, and on each side of the motor vehicle or trailer, or other cargo carrying body while it contains explosives or other dangerous articles of such type and in such quantity as specified in paragraph (d)(1)(ii)(a) of this subdivision. The front marking or placard may be displayed on the front of either the truck, truck body, truck tractor or the trailer.
7. Reference OSHA 1910.109(d)(2)(iii): Each motor vehicle used for transporting explosives shall be equipped with a minimum of two extinguishers, each having a rating of at least 10-BC.



8. Reference OSHA 1910.109(d)(2)(iii)(b): Extinguishers shall be filled and ready for immediate use and located near the driver's seat. Extinguishers shall be examined periodically by a competent person.
9. Reference 1910.109(d)(2)(iv): A motor vehicle used for transporting explosives shall be given the following inspection to determine that it is in proper condition for safe transportation of explosives:
10. Reference OSHA 1910.109(d)(2)(iv)(a): Fire extinguishers shall be filled and in working order.
11. Reference OSHA 1910.109(d)(2)(iv)(b): All electrical wiring shall be completely protected and securely fastened to prevent short-circuiting.
12. Reference OSHA 1910.109(d)(2)(iv)(c): Chassis, motor, pan, and underside of body shall be reasonably clean and free of excess oil and grease.
13. Reference OSHA 1910.109(d)(2)(iv)(d): Fuel tank and feed line shall be secure and have no leaks.
14. Reference OSHA 1910.109(d)(2)(iv)(e): Brakes, lights, horn, windshield wipers, and steering apparatus shall function properly.
15. Reference OSHA 1910.109(d)(2)(iv)(f): Tires shall be checked for proper inflation and defects.
16. Reference OSHA 1910.109(d)(2)(iv)(g): The vehicle shall be in proper condition in every other respect and acceptable for handling explosives.
17. Reference OSHA 1910.109(d)(3)(i): Vehicles transporting explosives shall only be driven by and be in the charge of a driver who is familiar with the traffic regulations, State laws, and the provisions of this section.
18. Reference OSHA 1910.109(d)(3)(iii): Every motor vehicle transporting any quantity of Class A or Class B explosives shall, at all times, be attended by a driver or other attendant of the motor carrier. This attendant shall have been made aware of the class of the explosive material in the vehicle and of its inherent dangers, and shall have been instructed in the measures and procedures to be followed in order to protect the public from those dangers. He shall have been made familiar with the vehicle he is assigned, and shall be trained, supplied with the necessary means, and authorized to move the vehicle when required.
19. Reference OSHA 1910.109(d)(3)(iii)(a): For the purpose of this subdivision, a motor vehicle shall be deemed "attended" only when the driver or other attendant is physically on or in the vehicle, or has the vehicle within his field of vision and can reach it quickly and without any kind of interference "attended" also means that the driver or attendant is awake, alert, and not

engaged in other duties or activities which may divert his attention from the vehicle, except for necessary communication with public officers, or representatives of the carrier shipper, or consignee, or except for necessary absence from the vehicle to obtain food or to provide for his physical comfort.

20. Reference OSHA 1910.109(d)(3)(iii)(b): However, an explosive-laden vehicle may be left unattended if parked within a securely fenced or walled area with all gates or entrances locked where parking of such vehicle is otherwise permissible, or at a magazine site established solely for the purpose of storing explosives.

21. Reference OSHA 1910.109(d)(3)(iv): No spark-producing metal, spark-producing metal tools, oils, matches, firearms, electric storage batteries, flammable substances, acids, oxidizing materials, or corrosive compounds shall be carried in the body of any motor truck and/or vehicle transporting explosives, unless the loading of such dangerous articles and the explosives comply with U.S. Department of Transportation regulations.

22. Reference OSHA 1910.109(d)(3)(v): Vehicles transporting explosives shall avoid congested areas and heavy traffic. Where routes through congested areas have been designated by local authorities such routes shall be followed.

23. Reference OSHA 1910.109(d)(3)(vi): Delivery shall only be made to authorized persons and into authorized magazines or authorized temporary storage or handling areas.

24. Reference DOD 4145.26-M, C3.16.1. Written Procedures. The contractor shall develop written procedures to ensure safe and efficient transportation of AE in motor vehicles.

25. Reference DOD 4145.26-M, C3.16.1.1. Brakes shall be set and the wheels chocked when the possibility exists that the vehicle could move during loading or unloading.

25. Reference DOD 4145.26-M, C3.16.1.2. AE shall not be loaded or unloaded when a motor vehicle's engine is running, unless the engine is providing power to accessories used in the loading and unloading, such as mechanical handling equipment. If the engine is diesel powered, it may continue to run during loading or unloading of explosives except when exposed explosives are involved.

27. Reference DOD, C3.16.1.3. Vehicles, including partly or completely loaded flatbeds, shall have the load blocked and braced to prevent shifting during transit.

28. Reference DOD 4145.26-M, C3.16.1.4. The operator shall not transport AE material in the passenger compartment of the vehicle.

29. Reference DOD 4145.26-M, C3.16.1.5. Motor vehicles transporting AE within the establishment but outside the explosives area shall bear at least two appropriate placards identifying the hazard division of the AE. These placards should be removed or covered whenever the vehicle is not loaded. Reflectorized placards are preferred.

30. Reference DOD 4145.26-M, C3.16.1.6. The vehicle operator shall be trained in emergency procedures to be followed in the event of a vehicle fire, breakdown, accident, damaged or leaking containers, and spilled AE material.

31. Reference DOD 4145.26-M, C3.16.2. Pre-loading Motor Vehicle Inspections. All motor vehicles used to transport AE shall be inspected daily before loading to verify:

- a. C3.16.2.1. Vehicles are in a safe operating condition.
- b. C3.16.2.2. Batteries and wiring are not in contact with containers of AE.
- c. C3.16.2.3. Exposed ferrous metal in the interior of the vehicle body is covered with non-sparking material when scrap and bulk explosives are being transported in containers that could be damaged or when explosives could otherwise become exposed.
- d. C3.16.2.4. A serviceable portable fire extinguisher of the appropriate class is carried on the motor vehicle.
- e. C3.16.2.5. Motor vehicles or equipment with internal combustion engines that are used near explosives scrap, waste, or items contaminated with explosives are equipped with exhaust system spark arresters and carburetor flame arresters (authorized air cleaners). These vehicles and equipment should be inspected and cleaned to prevent accumulation of carbon.

## Explosive Service International

### Job Safety Analysis

**Location:** Area I Material Staging Area – Camp Minden, LA

**Operation:** Place Material in Receiving Hopper, Transfer Material to Transfer Bin, and Move Loaded Transfer Bin for Weighing and Transport to Contained Burn Chamber

**Revision/Date:** Revision 5 (klw) 30 Jun 2015

		Failure Probability				
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
Failure Severity	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

**Special Hazards:** Accidental Fire/Detonation, Forklift Accident, Dropped Container, Spilled Propellant, Heat Stress/Cold Exposure

**Required and/or Recommended PPE:** 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Inspect propellant packaging and pallet for damage	Spilled Material/Fire	Explosives limits of 90,000# HD 1.1 at Staging Area, safety zone of 1,793' IBD, safety distances between other Area I operations use existing Area I barricades from Staging Area where possible, competent operators, coverage in SOPs for propellant packaging inspection, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use	5

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
		of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for material spills.	
Remove material from trailer	Dropped Pallet/Spilled Propellant/Fire/Explosion	2 man rule, licensed forklift operator, competent operators, operator training on propellant hazards, properly maintained forklift, fire extinguisher on forklift, good housekeeping and vegetation control around forklift movement area, and spill clean-up SOP.	5
Pour material from container (Super Sacks, Drums, or Boxes) into receiving hopper	Dropped Container Spilled Material Fire/Explosion	2 man rule, temporary all-weather covered work area, grounded and bonded aluminum hopper with wood lined end door, specially designed super sack station, drum station, or box station as appropriate, eyewash, licensed forklift operator, properly maintained forklift, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	10
Transfer material from receiving hopper into transfer bin	Spilled Material Fire/Explosion	2 man rule, temporary all-weather covered work area, grounded and bonded aluminum hopper with wood lined end door, non-sparking center flow transfer bin with covered lid, operator training on propellant hazards, SOP for propellant transfer operation, use of PPE, use of non-static/non-spark tools, strict control of heat producing devices, eyewash, good housekeeping, and vegetation control.	15
Move loaded transfer bin onto certified weigh scale	Dropped Transfer Bin Spilled Material Fire/Explosion	2 man rule, temporary all-weather covered work area, non-sparking center flow transfer bin with covered lid, eyewash, licensed forklift	10

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
		operator, properly maintained forklift, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	
Transport loaded transfer bin to Contained Burn Chamber	Muscle Strain/ Caught Between Moving Parts Dropped Transfer Bin Spilled Material Fire/Explosion	Licensed forklift operator, SOP for transfer bin inspection and handling, non-sparking center flow transfer bin with covered lid, use of PPE, use of non-static/non-spark tools, strict control of heat producing devices, and good housekeeping and vegetation control around container/pallet storage area.	5
Segregate, inspect, certify, and dispose of pallets	Muscle Strain Spilled Material/Fire	Coverage in SOPs for disposal of pallets, operator training on material contamination hazards, use of PPE, strict control of heat producing devices around material and pallet storage, good housekeeping maintained around pallet storage area, clear operator access and egress maintained around pallet storage area, use of 200% inspection to insure pallets are material free, 25' separation of pallet storage for fire prevention, certification of pallets being inert, and recycling by qualified recycler or disposal at approved landfill.	2
Segregate, inspect, certify, and dispose of banding	Muscle Strain Spilled Material/Fire	Coverage in SOPs for disposal of banding, operator training on material contamination hazards, use of PPE, strict control of heat producing devices around banding storage, good housekeeping maintained around banding storage area, clear operator access and egress maintained around banding	2

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
		storage area, use of 200% inspection to insure banding are material free, 25' separation of banding storage for fire prevention, certification of banding being inert, and recycling by qualified recycler or disposal at approved landfill.	
Segregate, inspect, certify, and dispose of plastic lining	Muscle Strain Spilled Material/Fire	Coverage in SOPs for segregation, inspection, certification, and disposal of plastic lining, operator training on material contamination hazards, use of PPE, strict control of heat producing devices around plastic lining storage, good housekeeping maintained around plastic lining storage area, clear operator access and egress maintained around plastic lining storage area, turn plastic lining inside out, use of 200% inspection to insure plastic lining are material free, 25' separation of plastic lining storage for fire prevention, certification of plastic lining being inert, and recycling by qualified recycler or disposal at approved landfill.	8
Segregate, inspect, certify, and dispose of cardboard container	Muscle Strain Spilled Material/Fire	Coverage in SOPs for segregation, inspection, certification, and disposal of cardboard container, operator training on material contamination hazards, use of PPE, strict control of heat producing devices around cardboard container storage, good housekeeping maintained around cardboard container storage area, clear operator access and egress maintained around cardboard container storage area, use of 200% inspection to insure cardboard container is material free, 25' separation of cardboard storage	

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
		for fire prevention, certification of cardboard container being inert, and recycling by qualified recycler or disposal at approved landfill.	

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Temporary all-weather covered work area (120'x60')	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Specially designed super sack station, drum station, and box station	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Aluminum receiving hopper	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Non-sparking transfer bins with covers	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Use of existing Area I barricade at Staging Area to reduce internal safety distance requirements where possible	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Forklift	Licensed operator	Daily operator inspection and periodic safety inspection
Temperature Gun	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for forklift and Material Staging Area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Eyewash	Operator training on proper use of eyewash	Supervisor/safety checks during daily monitoring



<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Standard Operating Procedures (SOPs) for material placement in receiving hopper and transfer to transfer bin	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Grounding and bonding wires with alligator clips	Operator training on proper use	Supervisor/safety check during daily monitoring
Non-static/non-spark tools for material leveling	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Transfer Bin Covers	Operator training on proper use	Supervisor/safety check during daily monitoring
Certified Weigh Scales	Supervisor and operator training on use	Supervisor check during daily monitoring

**Notes:** During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

**Other Site Specific Hazards that Should Be Noted:** Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

**References/Policy:** DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

**Summary:** The greatest risk (15) is during transfer of material into the receiving hopper as the material will be in direct contact with operators and their tools. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, use of existing Area I barricades to reduce internal safety

distance requirements from the Staging Area, temporary all-weather covered work area, specially designed super sack station, drum station, or box station as appropriate, grounded and bonded aluminum receiving hoppers non-sparking center flow transfer bin with covered lid, temperature gun, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, non-static/non-spark producing tools, portable fire extinguishers, eyewash, and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the material.

**Personnel Attending JSA Training:**

_____	_____	_____
_____	_____	_____
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_____	_____	_____

## SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Material Staging Area

Activity: Place Material in Receiving Hopper, Transfer Material to Transfer Bin, and Move Loaded Transfer Bin for Weighing and Transport to Contained Burn Chamber

The following additional A&E propellant handling risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3.: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3.: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4.: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1.: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain

exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.

- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.
- (8) Reference DOD 4145.26-M, C3.12.1.: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3.: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1.: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3.: **SMOKING.** Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4.: **HOT WORK PERMITS.** A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5.: **PORTABLE FIRE EXTINGUISHERS.** Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d)(1)(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d)(1)(ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d)(1)(iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (16) Reference OSHA 1910/178(l)(1)(i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).
- (17) Reference DOD 4145.26-M, C5.18.5.: Areas for Burning AE  
C5.18.5.1. Use QD formula  $D = K24W^{1/3}$  [9.52Q<sup>1/3</sup>] to determine the minimum safe distance for either personnel burning AE or those conducting unrelated AE operations. C5.18.5.2. Use QD formula  $D = K40W^{1/3}$  [15.87Q<sup>1/3</sup>] to determine the safe distance for persons not performing AE operations. However, if the NEWQD of burn material is more than 450 lbs. [204 kg], the minimum safe distance shall be at least 1,250 ft. [381 m]. If the NEWQD of burn material is < 450 lbs. [204 kg], use the minimum HFD given in Table AP2.T2. C5.18.5.3. Locate burning grounds at ILD from other PESs.
- (18) Reference DOD 4145.26-M, C8.8.2.: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (19) Reference DOD 4145.26-M, C15.2.2.: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (20) Reference DOD 4145.26-M, C15.6.: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site.
- (21) Reference DOD 4145.26-M, C15.7.: CONTAINERS FOR WASTE EXPLOSIVES Containers for AE awaiting destruction shall be the original closed packages or equivalent. Closures shall prevent spillage or leakage of contents when handled or overturned and shall not pinch or rub explosives during closing and opening. Containers shall be marked clearly to identify contents. Containers constructed with spark-producing or easily ignited material shall not be used.
- (22) Reference DOD 4145.26-M, C15.8.3.3.: Containers of explosives or ammunition items to be destroyed at the destruction site shall be spotted and opened at least 10

ft. [3.05 m] from each other and from explosive material set out earlier, to prevent rapid transmission of fire if premature ignition should occur.

- (23) Reference DOD 4145.26-M, C15.8.3.4.: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (24) Reference DOD 4145.26-M, C15.9.1.: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.
- (25) Reference DOD 4145.26-M, C15.9.3.1.: The explosive bed shall be no more than 3 inches [76 mm] deep.
- (26) Reference DOD 4145.26-M, C15.9.3.3.: No burning shall take place when wind velocity exceeds 15 mph [24 km/h].
- (27) Reference DOD 4145.26-M, C15.9.3.6.: The sites of misfires shall be evacuated for at least 30 minutes. Operators shall implement misfire procedures and shall notify safety and emergency response personnel to ensure all appropriate safety precautions are taken before approaching the explosives burn bed. Only two trained and qualified operators shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection. The backup shall follow contractor procedures should an accident occur.
- (28) Reference DOD 4145.26-M C15.9.8.: Parallel beds of explosives prepared for burning shall be separated by not less than 150 ft. [46 m]. Care shall be taken to prevent material igniting from smoldering residue or from heat retained in the ground from previous burning operations. Unless a burned-over plot has been saturated with water and passed a safety inspection, 24 hours shall elapse before the next burning.

## Explosive Service International

### Job Safety Analysis

**Location:** Area I Contained Burn Chamber – Camp Minden, LA

**Operation:** Burn Material in Contained Burn Chamber

**Revision/Date:** Revision 5 (klw) 30 Jun 2015

		Failure Probability				
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
Failure Severity	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

**Special Hazards:** Accidental Burn/Detonation, Misfire, Safety Zone Deviation, Heat Stress/Cold Exposure

**Required and/or Recommended PPE:** 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Transfer material from transfer bin into burn tray	Caught Between Moving Parts Dropped Bin/Tray Spilled Propellant Fire/Explosion	Non-sparking transfer bin with lid, temperature gun, explosives limits of 880# HD 1.1, safety zone of 1,250', safety distances between other Area I operations, 2 man rule, licensed forklift operator, properly maintained forklift, good roadway and access, coverage in SOPs for material loading, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	10

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Remove expended burn tray to cooling area and replace loaded burn tray on Contained Burn Chamber shelf	Caught Between Moving Parts Dropped Tray/Hopper Spilled Propellant Fire/Explosion	Explosives limits of 880# HD 1.1, safety zone of 1,250', safety distances between other Area I operations, 2 man rule, licensed forklift operator, properly maintained forklift, good roadway and access, coverage in SOPs for loading, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	5
Carry thermal initiators and thermal boosters in metal storage container to Contained Burn Chamber	Thermal Initiator/Booster Pre-Mature Initiation/Burn	Thermal initiators and thermal boosters stored in magazine with 500# HD 1.3 limits and 50' fire protection distance, 2 man rule, PPE, SOPs, operator training on initiator hazards, firing circuit disconnected from firing source and shunted, initiators stored in separate metal container, initiators shunted, RF controls, exclusion zone, fire extinguisher and eyewash in Contained Burn Chamber area, good housekeeping/vegetation control around Contained Burn Chamber.	5
Connect thermal initiator/booster to firing wires and place thermal initiator/booster in Contained Burn Chamber burn tray	Thermal Initiator/Booster Pre-Mature Burn/Explosion	2 man rule, PPE, SOPs, operator training on initiator and propellant hazards, firing circuit disconnected from firing source and shunted, firing circuit tested prior to connection, radio frequency controls, exclusion zone established, fire extinguisher and eyewash in Contained Burn Chamber area, good housekeeping and vegetation control around Contained Burn Chamber.	15



<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Return to Operation Control Center	Pre-Mature Burn/Explosion	231' operator protection in case of 880# HD 1.1 event at Contained Burn Chamber, 2 man rule, PPE, SOPs, radio frequency controls, safe distance, protective structure, and exclusion zone or 1,250'	5
Connect firing circuit to firing source and initiate burn tray sequence in Contained Burn Chamber	Pre-Mature Burn/Explosion	231' operator protection in case of 880# HD 1.1 event at Contained Burn Chamber, 2 man rule, PPE, SOPs, radio frequency controls, safe distance, protective structure, exclusion zone, remove shunt from firing circuit and test continuity, connect firing source and initiate firing sequence, monitor burn temperature and pressure for safe approach.	5
Inspection/Maintenance inside Contained Burn Chamber and Pollution Control Equipment	Asphyxiation/Skin Burn/Chemical Exposure	Confined space entry permit, monitoring of oxygen and chemical levels, SOPs, PPE, eyewash in CBC and pollution control areas, training of operators on confined space entry, compliance with 29 CFR 1910.146 requirements.	10
Replace Ammonium Hydroxide in aboveground storage tank for use in CBC pollution control equipment	Asphyxiation/Skin Burn/Chemical Exposure	10,000 gallon tank located at least 231' for operator protection in case of 880# HD 1.1 event at Contained Burn Chamber, 2 man rule, PPE, SOPs, and eyewash at CBC and pollution control equipment.	10

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Thermal Initiators and Thermal Boosters	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Metal Container	Supervisor and operator training on use	Supervisor/safety check during daily monitoring

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Continuity Tester	Supervisor and operator training on continuity test procedure	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for Contained Burn Chamber area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for Contained Burn Chamber operation	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Burn Tray Covers	Operator training on proper use	Supervisor/safety check during daily monitoring
Oxygen and Carbon Monoxide Meter	Safety and supervisor training on proper use	Supervisor/safety check prior to use
Temperature Gun	Safety and supervisor training on proper use	Supervisor/safety check prior to use
Eyewash in Contained Burn Chamber and Pollution Control Equipment Area	Operator training on proper use	Supervisor/safety check during daily monitoring

**Notes:** During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

**Other Site Specific Hazards that Should Be Noted:** Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

**References/Policy:** DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

**Summary:** The greatest risk (15) is during connecting the thermal initiator and thermal booster to firing wires and placing thermal initiator/booster in Contained Burn Chamber as the material will be in vicinity with operators and the thermal initiator/booster. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, disconnected firing source and shunted firing circuit, metal container and shunted thermal initiators, use of non-static/non-spark tools, grounded burn trays, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, portable fire extinguishers, safe distance, protective firing bunker, exclusion zone, and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the material.



## SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Contained Burn Chamber

Activity: Burn Material in Contained Burn Chamber

The following additional A&E handling risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3.: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3.: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4.: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1.: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M,C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.

- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.
- (8) Reference DOD 4145.26-M, C3.12.1.: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3.: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1.: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3.: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4.: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5.: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d)(1)(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d)(1)(ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d)(1)(iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified

for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.

- (16) Reference OSHA 1910/178(l)(1)(i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).
- (17) Reference DOD 4145.26-M, C5.18.5.: Areas for Burning AE  
C5.18.5.1. Use QD formula  $D = K24W^{1/3}$  [9.52Q<sup>1/3</sup>] to determine the minimum safe distance for either personnel burning AE or those conducting unrelated AE operations. C5.18.5.2. Use QD formula  $D = K40W^{1/3}$  [15.87Q<sup>1/3</sup>] to determine the safe distance for persons not performing AE operations. However, if the NEWQD of burn material is more than 450 lbs. [204 kg], the minimum safe distance shall be at least 1,250 ft. [381 m]. If the NEWQD of burn material is < 450 lbs. [204 kg], use the minimum HFD given in Table AP2.T2. C5.18.5.3. Locate burning grounds at ILD from other PESs.
- (18) Reference DOD 4145.26-M, C8.8.2.: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (19) Reference DOD 4145.26-M, C15.2.2.: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (20) Reference DOD 4145.26-M, C15.6.: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site
- (21) Reference DOD 4145.26-M, C15.8.3.3.: Containers of explosives or ammunition items to be destroyed at the destruction site shall be spotted and opened at least 10 ft. [3.05 m] from each other and from explosive material set out earlier, to prevent rapid transmission of fire if premature ignition should occur.
- (22) Reference DOD 4145.26-M, C15.8.3.4.: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (23) Reference DOD 4145.26-M, C15.9.1.: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.

- (24) Reference DOD 4145.26-M, C15.9.3.1.: The explosive bed shall be no more than 3 inches [76 mm] deep.
- (25) Reference DOD 4145.26-M, C15.9.3.3.: No burning shall take place when wind velocity exceeds 15 mph [24 km/h].
- (26) Reference DOD 4145.26-M, C15.9.3.6.: The sites of misfires shall be evacuated for at least 30 minutes. Operators shall implement misfire procedures and shall notify safety and emergency response personnel to ensure all appropriate safety precautions are taken before approaching the explosives burn bed. Only two trained and qualified operators shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection. The backup shall follow contractor procedures should an accident occur.
- (27) Reference DOD 4145.26-M C15.9.8.: Parallel beds of explosives prepared for burning shall be separated by not less than 150 ft. [46 m]. Care shall be taken to prevent material igniting from smoldering residue or from heat retained in the ground from previous burning operations. Unless a burned-over plot has been saturated with water and passed a safety inspection, 24 hours shall elapse before the next burning.
- (28) Reference DOD 4145.26-M, C15.8.2.2.2.: Except during electrical continuity testing of the blasting cap and lead wires, the shunt shall not be removed from the lead wires of the blasting cap until the moment of connection to the blasting circuit,. If the shunt is removed to test the blasting cap, short circuit the lead wires again following the test by twisting the bare ends of the wires together. The wires shall remain short-circuited in this manner until the moment of connection to the blasting circuit.
- (29) Reference DOD 4145.26-M, C15.8.2.2.4.: Blasting circuit wires shall be twisted pairs. Operators shall keep blasting circuit wires twisted together and connected to ground at the power source and twisted at the opposite end at all times except when actually firing the charge or testing circuit for continuity and current or voltage. Never connect the blasting cap to the blasting circuit wires unless the blasting circuit wires are shorted and grounded at the ends near the power source.
- (30) Reference DOD 4145.26-M, C15.8.2.2.5.: Electric blasting or demolition operations and unshielded electric blasting caps shall be separated from radio frequency (RF) energy transmitters by safe distances.
- (31) Reference DOD 4145.26-M, C15.8.2.2.6.: When transported by vehicles with two-way radios, and when in areas presumed to have extraneous electromagnetic pulse, blasting caps shall be in closed metal boxes.
- (32) Reference DOD 4145.26-M, C15.8.2.2.7.: Operators should follow these procedures when connecting electric blasting cap lead wires to the blasting circuit wires.
- (33) Reference DOD 4145.26-M, C15.8.2.2.7.1.: The blasting circuit wires shall be tested for electrical continuity.



- (34) Reference DOD 4145.26-M, C15.8.2.2.7.2.: The blasting circuit shall be tested for extraneous current and voltage. To test, arrange a dummy test circuit similar to the actual blasting circuit, except substitute a radio pilot lamp of suitable voltage for the blasting cap. If the pilot lamp glows, indicating potentially dangerous amounts of RF energy, blasting operations using electric blasting caps shall stop. Blasting operations may proceed using non-electric blasting caps and a safety fuse. The contractor may substitute other test instruments such as the DuPont "Detect-A-Meter" or "Voltohmmeter" for the radio pilot lamp. If the potential source of extraneous electromagnetic pulse is from a radar, a television, or a microwave transmitter, the actual blasting circuit -- including the blasting cap (without other explosives) -- shall be tested for extraneous effects. Personnel performing such tests shall be protected from the effects of an exploding blasting cap.
- (35) Reference DOD 4145.26-M, C15.8.2.2.7.3.: The blasting cap and its lead wires shall be tested for electrical continuity. Personnel performing such tests shall be protected from the effects of an exploding blasting cap. The individual who removes the shunt should ground himself or herself by grasping the blasting circuit wire prior to performing the operation in order to prevent accumulated static electricity from firing the blasting cap.
- (36) Reference DOD 4145.26-M, C15.8.2.2.7.4.: Personnel shall first assure the blasting circuit wires are shorted and grounded at the power source and then connect the blasting cap lead wires to the blasting circuit wires.
- (37) Reference DOD 4145.26-M, C15.8.2.2.7.5.: All but two persons shall evacuate from the area. One person shall partially retreat and act as safety observer. The other person shall maintain physical possession of a safety device that locks out the blasting circuit (e.g., plug, key, pigtail) and shall place the blasting cap onto the charge. Both persons will then retreat to the personnel shelter.
- (38) Reference DOD 4145.26-M, C15.8.2.2.7.6.: The operator shall disconnect the blasting circuit wires from ground at the power source, untwist the wires, and use a galvanometer to test the firing circuit for electric continuity before connection to the blasting machine or firing panel.
- (39) Reference DOD 4145.26-M, C15.8.2.2.7.7.: The individual assigned to make the connections shall confirm that everyone in the vicinity is in a safe place before connecting the blasting circuit wires to the power source and signaling for detonation. This individual shall not leave the blasting machine or its actuating device for any reason and, when using a panel, shall lock the switch in the open position until ready to fire, retaining the only key. After accounting for all personnel, the blasting circuit wires shall be connected to the power source and the charge fired.
- (40) Reference DOD 4145.26-M, C15.8.2.2.7.8.: After firing, the blasting circuit wires shall be disconnected from power source, the wires twisted together, and connected to ground.
- (41) Reference DOD 4145.26-M, C15.8.2.2.7.9.: Blasting and destruction operations shall be suspended when electrical storms are in the vicinity. At the first sign of an

electrical storm, short-circuit the blasting cap lead wires, short-circuit and ground the blasting circuit wires, and evacuate all personnel from the demolition area to a safe location.

- (42) Reference DOD 4160.28M, Enclosure 3, Paragraph 6.: CERTIFICATION OF DEMIL
- a. Certification. A certificate as shown in the sample format in Figure 1 shall be signed and dated by a DOD contracted person or a Government employee who actually performed or witnessed the DEMIL. The certificate shall be executed for all line items demilitarized. If the item is classified, it must first be declassified and certified as shown in the sample format in Figure 2.
  - b. Verification. The DEMIL certificate must be verified by a technically qualified DOD contracted person or a Government employee who witnessed the DEMIL of the material or inspected the residue. The individual who verifies the DEMIL should generally be at least in the next higher management or technical level to the initial certifying individual and must be a U.S. citizen.
    - (1) The certification and verification shall include the printed or typed name, grade, rank, or title, and activity of each signatory.
    - (2) Signing false DEMIL certificates constitutes a felony and may subject the individual to prosecution.
  - c. Contractor Sites. These sites are required to have a Government employee acting as a verifier during all DEMIL activities. To certify that DEMIL is complete, a certifier works with the Government verifier to validate DEMIL.
  - d. Records Retention Policy for DEMIL Certificates. DOD is responsible for managing their records and documents in accordance with DODD 5015.2 (Reference (1)).

## Explosive Service International

### Job Safety Analysis

**Location:** Area I Contained Burn Chamber – Camp Minden, LA

**Operation:** Clean-Up Material Residue in Burn Trays

**Revision/Date:** Revision 5 (klw) 30 Jun 2015

		Failure Probability				
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
Failure Severity	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

**Special Hazards:** Contact Burns, Accidental Fire, Forklift Accident, Spilled Residue, Mixing Material with Residue, Heat Stress/Cold Exposure

**Required and/or Recommended PPE:** 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Wait for temperature and pressure in Contained Burn Chamber to be within limits and proceed to expended burn pan with loaded transfer bin	Skin Burn/Delayed Fire	2 man rule, PPE, SOPs, disconnect and shunt firing circuit, operator training on propellant residue hazards, use wait period, temperature gun, exclusion zone, fire extinguisher and eyewash in CBC area, and good housekeeping/vegetation control around burn pans.	5

<b>Sequence of Job Steps:</b>	<b>Potential Hazards:</b>	<b>Recommendation to Eliminate/Reduce Potential Hazards:</b>	<b>RAC</b>
Inspect residue in burn tray and area around burn tray for excess propellant	Skin Burn/Delayed Fire	2 man rule, PPE, SOPs, operator training on propellant residue hazards, measure residue temperature with temperature gun, radio frequency controls, exclusion zone, fire extinguisher and eyewash in CBC area, and good housekeeping and vegetation control around burn trays.	10
Remove expended burn tray and place loaded burn tray on CBC shelf	Skin Burn/Delayed Fire	2 man rule, licensed forklift operator, properly maintained forklift, PPE, good roadway and access, coverage in SOPs for loading, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	5
Transport residue in expended burn tray back to cooling area	Skin Burn/Delayed Fire/Dropped Pan/Spilled Residue	2 man rule, licensed forklift operator, properly maintained forklift, PPE, good roadway and access, operator training on material hazards, strict control of heat producing devices around material, and coverage in SOPs for material spills.	5
As required, remove residue from burn trays and place in disposal containers	Skin Burn/Back Strain/Delayed Fire	2 man rule, PPE, SOPs, non-static/non-spark tools, fire extinguisher and eyewash in Material Staging Area, use material handling equipment for residue drums, certify residue as inert, and good housekeeping and vegetation control around burn trays.	5
As required, clean-up and segregate excess propellant for re-burn	Skin Burn/Back Strain/Delayed Fire	2 man rule, PPE, SOPs, non-static/non-spark tools, fire extinguisher and eyewash in Material Staging Area, use material handling equipment for excess propellant drums, track excess propellant for re-burn, and good housekeeping and vegetation control around burn trays.	10

<b>Equipment</b>	<b>Training</b>	<b>Inspection</b>
Forklift	Licensed operator	Daily operator inspection and periodic safety inspection
Temperature Gun	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Residue Containers	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Excess Propellant Containers	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for forklift, and contained burn area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material residue clean-up in burn trays	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools for material leveling	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Burn Tray Covers	Operator training on proper use	Supervisor/safety check during daily monitoring
Eyewash in Contained Burn Chamber and Staging Area	Operator training on proper use	Supervisor/safety checks during daily monitoring

**Notes:** During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

**Other Site Specific Hazards that Should Be Noted:** Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

**References/Policy:** DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

**Summary:** The greatest risk (10) is during residue and excess material inspection and removal as the residue and material will be in direct contact with operators. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the residue material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the residue material, such as: SOPs, PPE, operator training, disconnected firing source and shunted firing circuit, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, portable fire extinguishers, exclusion zone, non-static/non-spark tools and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the residue material.

**Personnel Attending JSA Training:**

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____
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_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____


## SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Contained Burn Chamber

Activity: Clean-up Material Residue in Burn Trays

The following additional A&E handling risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3.: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3.: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4.: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1.: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain



exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.

- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.
- (8) Reference DOD 4145.26-M, C3.12.1.: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3.: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1.: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3.: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4.: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5.: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d)(1)(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d)(1)(ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d)(1)(iii) Select PPE that properly fits each affected employee. Note:

Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (16) Reference OSHA 1910/178(l)(1)(i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).
- (17) Reference DOD 4145.26-M, C8.8.2.: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (18) Reference DOD 4145.26-M, C15.2.2.: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (19) Reference DOD 4145.26-M, C15.6.: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site
- (20) Reference DOD 4145.26-M, C15.7.: CONTAINERS FOR WASTE EXPLOSIVES Containers for AE awaiting destruction shall be the original closed packages or equivalent. Closures shall prevent spillage or leakage of contents when handled or overturned and shall not pinch or rub explosives during closing and opening. Containers shall be marked clearly to identify contents. Containers constructed with spark-producing or easily ignited material shall not be used.
- (21) Reference DOD 4145.26-M, C15.8.3.4.: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (22) Reference DOD 4145.26-M, C15.9.1.: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.

Appendix D  
Material Safety Data Sheets

Material Safety Data Sheet  
M6 Propellant

**HERCULES INCORPORATED -- PROPELLANT,EXPLOSIVE,SOLID,M6+2F/76MM --  
1376-00N010938**

===== Product Identification =====

Product ID:PROPELLANT,EXPLOSIVE,SOLID,M6+2F/76MM

MSDS Date:01/09/1986

FSC:1376

NIIN:00N010938

MSDS Number: BHVKT

=== Responsible Party ===

Company Name:HERCULES INCORPORATED

Address:RADFORD ARMY AMMUNITION PLANT

City:RADFORD

State:VA

ZIP:24141

Info Phone Num:703-639-7294

Emergency Phone Num:703-639-7294

CAGE:2D295

=== Contractor Identification ===

Company Name:HERCULES INC

Address:RADFORD ARMY AMMUNITION PLANT

Box:City:RADFORD

State:VA

ZIP:24141

Country:US

Phone:703-639-7294

CAGE:2D881

Company Name:HERCULES INCORPORATED

Address:84 5TH AVE

City:NEW YORK

State:NY

ZIP:10011-7603

Country:US

CAGE:2D295

===== Composition/Information on Ingredients =====

Ingred Name:DIBUTYL PHTHALATE (SARA III)

CAS:84-74-2

RTECS #:TI0875000

Fraction by Wt: 3.00%

Other REC Limits:N/K

OSHA PEL:5 MG/M3

ACGIH TLV:5 MG/M3; 9192

EPA Rpt Qty:10 LBS

DOT Rpt Qty:10 LBS

Ingred Name:DIPHENYLAMINE

CAS:122-39-4

RTECS #:JJ7800000

Fraction by Wt: 1.00%

Other REC Limits:N/K

OSHA PEL:10 MG/M3

ACGIH TLV:10 MG/M3; 9192

Ingred Name:POTASSIUM SULFATE

000412



9530601

CAS:7778-80-5  
RTECS #:TT5900000  
Fraction by Wt: 2.00%  
Other REC Limits:N/K  
OSHA PEL:N/K  
ACGIH TLV:N/K

Ingred Name:NITROCELLULOSE (FLAMMABLE SOLID)  
Fraction by Wt: 87.00%  
Other REC Limits:N/K  
OSHA PEL:N/K  
ACGIH TLV:N/K

Ingred Name:DINITROTOLUENE (SARA III)  
CAS:25321-14-6  
RTECS #:XT1300000  
Fraction by Wt: 10.00%  
Other REC Limits:N/K  
OSHA PEL:S;A2;0.15 MG/M3;9293  
ACGIH TLV:S, 1.5 MG/M3  
EPA Rpt Qty:10 LBS  
DOT Rpt Qty:10 LBS

=====  
===== Hazards Identification =====

LD50 LC50 Mixture:N/K  
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES  
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO  
Health Hazards Acute and Chronic:SEE SIGNS AND SYMPTOMS OF  
OVEREXPOSURE.  
Explanation of Carcinogenicity:NONE  
Effects of Overexposure:EYES:N/K .SKIN:TOXIC,AVOID SKIN  
CONTACT.INGESTION:TOXIC,AVOID INGESTION.INHALATION:TOXIC,AVOID  
INHALATION.  
Medical Cond Aggravated by Exposure:N/K

=====  
===== First Aid Measures =====

First Aid:EYES:IN CASE OF CONTACT,IMMEDIATELY FLUSH WITH PLENTY OF LOW  
PRESSURE WATER FOR AT LEAST 15 MINUTES.REMOVE ANY CONTACT LENSES TO  
ASSURE THOROUGH FLUSHING.CALL A PHYSICIAN.SKIN:WASH WITH SOAP AND  
RUNNI NG WATER.INGESTION:CONTACT MD IMMEDIATELY .INHALATION:REMOVE  
TO FRESH AIR.TREAT ANY IRRITATION SYMPTOMATICALLY.CALL A PHYSICIAN.

=====  
===== Fire Fighting Measures =====

Extinguishing Media:SELF-OXIDIZING,DELUGE W/ H\*2O.MAY NOT BE ABLE TO  
EXTING MATL BEFORE IT IS CONSUMED UNLESS LRG QTY USED IN SHORT  
TIME.  
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL  
PROTECTIVE EQUIPMENT .EVACUATE THE AREA.  
Unusual Fire/Explosion Hazard:EASILY IGNITED,HIGHLY COMBUSTIBLE;PROTECT  
FROM FIRE,SPARKS & EXTREME HEAT.AUTOIGNITION  
TEMP:383F,195C.HAZARDOUS DECOMPOSITION PRODUCTS:OXIDES OF CARBON.

=====  
===== Accidental Release Measures =====

000413

Spill Release Procedures:CLEAN UP SPILLS IMMEDIATELY USING A SOFT BRISTLE BRUSH AND A CONDUCTIVE RUBBER OR PLASTIC SHOVEL.USE CAUTION,MATERIAL SENSITIVE TO IMPACT, FRICTION AND ELECTROSTATIC DISCHARGE.

Neutralizing Agent:N/K

=====  
Handling and Storage

Handling and Storage Precautions:AVOID PRLNG TEMP ABOVE 50C,125F.REC:21C,75F;50% HUMIDITY.STOR MUST CONFORM TO LOCAL, STATE, FEDERAL REGS (OSHA 29CFR1910.109;BATF 27CFR55 SUBPART K).

Other Precautions:WARNING,FLAMMABLE SOLID.KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME.KEEP CONTAINERS CLOSED.USE WITH ADEQUATE VENTILATION.

=====  
Exposure Controls/Personal Protection

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .

Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW TLV .

Protective Gloves:COTTON OR LEATHER.

Eye Protection:SAFETY GLASSES

Other Protective Equipment:FLAMEPROOF COVERALLS AND CONDUCTIVE SHOES.

Work Hygienic Practices:N/K

Supplemental Safety and Health

ROUTES OF ENTRY:INGEST/SKIN/INHAL .

=====  
Physical/Chemical Properties

Melt/Freeze Pt:M.P/F.P Text:N/K

Decomp Temp:Decomp Text:N/K

Vapor Pres:NEGLIGIBLE

Spec Gravity:1.4955,WATER=1

Evaporation Rate & Reference:<1 (BUTYL ACETATE=1)

Solubility in Water:NEGLIGIBLE

Appearance and Odor:HARD CYLINDER, PERFORATED, SMOOTH, GREENISH YELLOW COLOR.ODORLESS.

=====  
Stability and Reactivity Data

Stability Indicator/Materials to Avoid:YES

OXIDES OF NITROGEN AND CARBON.

Stability Condition to Avoid:AVOID OPEN FLAME, SPARKS AND HEAT.

Hazardous Decomposition Products:OXIDES OF CARBON.

=====  
Disposal Considerations

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS .BURN IN OPEN BURNING GROUND IN ACCORDANCE WITH REGULATIONS.MAY ALSO BE BURNED IN AN INCINERATOR APPROVED FOR EXPLOSIVES.

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000415



Material Safety Data Sheet  
Nitrocellulose

KOPPERS CO INC -- NITROCELLULOSE -- 8010-00-242-6319

=====  
Product Identification  
=====

Product ID:NITROCELLULOSE  
MSDS Date:01/01/1987  
FSC:8010  
NIIN:00-242-6319  
MSDS Number: BDMVK

=== Responsible Party ===  
Company Name:KOPPERS CO INC  
Address:3000 KOPPERS BLDG  
City:PITTSBURGH  
State:PA  
ZIP:15219-1818  
Country:US  
CAGE:80592

=== Contractor Identification ===  
Company Name:KOPPERS CO INC  
Address:3000 KOPPERS BLDG  
Box:City:PITTSBURGH  
State:PA  
ZIP:15219-1818  
Country:US  
CAGE:80592

=====  
Composition/Information on Ingredients  
=====

Ingred Name:ALKYD/NITROCELLULOSE

Ingred Name:NAPHTHA (PETROLEUM SPIRITS OR BENZIN)  
CAS:8030-30-6  
RTECS #:SE755000  
Fraction by Wt: 9.0%  
OSHA PEL:100 PPM

Ingred Name:AMSCO 6645 SOLVENT  
Fraction by Wt: 18.7%  
ACGIH TLV:200PPM

Ingred Name:ISOPROPYL ALCOHOL (SARA III)  
CAS:67-63-0  
RTECS #:NT805000  
OSHA PEL:400 PPM/500 STEL  
ACGIH TLV:400 PPM/500STEL;9192

Ingred Name:N-BUTYL ACETATE (SARA III)  
CAS:123-86-4  
RTECS #:AF735000  
Other REC Limits:NONE RECOMMENDED  
OSHA PEL:150 PPM  
ACGIH TLV:150 PPM/200STEL;9394  
EPA Rpt Qty:5000 LBS  
DOT Rpt Qty:5000 LBS

=====  
Hazards Identification  
=====

Effects of Overexposure:SYSTEMIC TOXIC EFFECTS MAY ALSO RESULT FR SKIN  
ABSORB.IRRIT TO EYES,NOSE & THROAT NR OR ABOV 25PPM.

=====  
First Aid Measures  
=====

First Aid:IF INHALED,REMOVE TO FRESH AIR.IF NOT BREATHING,GIVE  
ARTIFICIAL RESPIRATION,PREFERABLY MOUTH TO MOUTH.CALL A DR.IN CASE  
OF SKIN CONTACT,WASH THOROUGHLY W/SOAP & WATER,FOR EYES,FLUSH  
IMMED.W/PLENTY OF WATER FOR 15 MIN. & CONTACT A DR.WASH CONTAM

=====  
Fire Fighting Measures  
=====

Flash Point:23 F TCC -5C  
Extinguishing Media:FOAM,DRY CHEMICAL,WATER SPRAY FOG OR CO\*2.  
Fire Fighting Procedures:USE AIR SUPPLIED EQPMT FOR ENCL AREAS.COOL  
EXPOS CONTAINERS  
Unusual Fire/Explosion Hazard:KEEP AWAY FROM HEAT HEAT,SPARKS AND  
FLAME.

=====  
Accidental Release Measures  
=====

Spill Release Procedures:REMOVE ALL SOURCES OF  
IGNITION(FLAME,ELECTRICAL,STATIC OR FRICTIONAL SPARKS;HOT  
SURFACES,ETC.)AVOID BREATHING VAPORS.VENTILATE AREA.CONTAIN & SCOOP  
UP SPILL W/NON-SPARKING TOOLS,RAGS,ETC.USE INERT ABS ORBENT  
MATERIALS ON SM SPILLS OR ON RESIDUAL OF

=====  
Handling and Storage  
=====

Handling and Storage Precautions:KEEP CONTAINERS CLOSED & UPRIGHT TO  
PREVENT LEAKAGE.AVOID FLAMES,WELDING,SMOKING,SPARKS,OPEN  
LIGHTS,ETC.AND BREATHING OF VAP OR SPRAY MIST.AVD EYE &  
Other Precautions:MAINTAIN GOOD PERSONAL HYGIENE.DO NOT USE IN CONFINED  
AREAS,TANK OR PIT W/O ADEQUATE VENTILATION.

=====  
Exposure Controls/Personal Protection  
=====

Respiratory Protection:ORGANIC VAP CANISTER WHERE OXYGEN CONTENT IS  
ADEQUATE & VAP CONCENTR  
Ventilation:LOCAL EXHAUST & MECHANICAL  
Protective Gloves:RUBBER GLOVES  
Eye Protection:GOGGLES  
Supplemental Safety and Health  
HAZ.INGRED:BUTYL CELLOSOLVE,EP3600000,6.3%,25PPM;METHYL ISOBUTYL  
CARBINOL, P05776000,5.0%,25PPM;METHYL ISOBUTYL  
KETONE,P06125000,8.0%,50 PPM.METHYL ETHYL  
KETONE,PM7780000,5.2%,200PPM

=====  
Physical/Chemical Properties  
=====

HCC:F2  
Vapor Density:HEAV  
Spec Gravity:8.0 LB

Evaporation Rate & Reference:N. BUTYL ACET-FAST  
Solubility in Water:NEGLIGIBLE  
Appearance and Odor:VISCOUS BLUE LIQUID W/TYPICAL SOLVENT ODOR  
Percent Volatiles by Volume:74

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE W/LOCAL APPLICABLE  
REGS.

Disclaimer (provided with this information by the compiling agencies):  
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of Defense. The United States of America in no manner whatsoever,  
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document should seek competent professional advice to verify and  
assume responsibility for the suitability of this information to their  
particular situation.

Material Safety Data Sheet  
Ammonium Hydroxide



**SOUTHERN IONICS INCORPORATED (SII)**  
**SAFETY DATA SHEET**

SDS NO. 216  
Effective Date: April 30, 2015  
Revision Date:

I. Product and Company Information			
SII Product Name(s):	AQUA-CAT® Aqua Ammonia	Synonym:	Ammonia Solution
Chemical Name:	Ammonium Hydroxide	CAS Number:	1336-21-6
<b>Manufacturer's Name:</b> Southern Ionics Incorporated 210 Commerce Street West Point, MS 39773 Customer Service: 1-800-953-3585 Web Site <a href="http://www.southernionics.com">www.southernionics.com</a>		<b>Emergency Contacts:</b> Afterhours (Southern Ionics) 1-888-610-2379  For Chemical Emergency, Spill or Accident Call CHEMTREC at 1-800-424-9300 CHEMTREC CCN - 20596	

II. Hazard Identification	
OSHA HCS / GHS Classification(s):	Hazard Statement(s):
Acute Toxicity, Oral (Category 4)	Harmful if swallowed.
Skin Corrosion (Category 1)	Causes severe skin burn.
Serious Eye Damage (Category 1)	Causes serious eye damage.
Specific Target Organ Toxicity (Respiratory - single exposure) - (Category 3)	May cause respiratory irritation.
Acute Aquatic Toxicity (Category 1)	Very toxic to aquatic life.
Signal Word:	Precautionary Statement(s):
Danger	<b>Prevention:</b> Wash affected body parts thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear eye and face protection. Wear protective gloves and clothing. Do not breathe mist, vapors, or spray. Avoid release to the environment.  <b>Response:</b> IF SWALLOWED: Rinse mouth. Do not induce vomiting. Immediately seek medical advice. IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. IF INHALED: Remove victim to fresh air and keep comfortable for breathing. Collect spillage: See section VI - Accidental Release Measures. For specific treatment: See section IV - First Aid Measures.

III. Composition / Information on Ingredients		
Chemical Name	CAS Reg #'s	%
Ammonia (NH <sub>3</sub> )	7664-41-7	19 - 30.5
Water	7732-18-5	Balance

IV. First Aid Measures	
<b>Eyes:</b>	Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Remove any contact lenses. Seek medical attention, if you feel unwell.
<b>Dermal / Skin:</b>	Remove contaminated clothing and wash exposed area thoroughly with soap and water. Seek medical attention, if you feel unwell.
<b>Inhalation:</b>	Move to fresh air immediately. If breathing is difficult, give oxygen. Seek medical attention, if you feel unwell.
<b>Ingestion:</b>	If swallowed, DO NOT induce vomiting. Rinse mouth. Seek medical attention, if you feel unwell.

V. Fire Fighting Measures				
<b>NFPA Hazard Rating:</b>	<b>Health (Blue)</b>	<b>Fire (Red)</b>	<b>Reactivity (Yellow)</b>	<b>Special Instructions (White)</b>
	3	1	0	None
<b>NFPA Hazard Classification: 0 = Least 1= Slight 2 = Moderate 3 = High 4 = Extreme</b>				
<b>Extinguishing Media:</b>	Use extinguishing media appropriate for surrounding fire (Not CO <sub>2</sub> ).			
<b>Special Firefighting Procedure:</b>	Wear full protective clothing and a self-contained breathing apparatus (SCBA) because toxic fumes are emitted. Stop flow if possible. Use water to keep fire-exposed containers cool and to protect persons shutting off flow of liquid. For a serious leak, use fire hose with a fog nozzle and plenty of water to absorb ammonia vapors.			
<b>Unusual Fire and Explosive Hazards:</b>	At elevated temperatures, aqua ammonia will emit ammonia gas and possibly small amounts of nitrogen oxides which have been classified as toxic. Presence of oil or other combustible materials increases the fire hazard of ammonia gas. Ammonia concentrations in the range of 16-25% by volume in air can be ignited or caused to explode if heated to the auto-ignition temperature.			

VI. Accidental Release Measures	
<b>Precaution if Spilled or Released:</b>	Steps should be taken to contain spilled liquids and prevent discharges to streams or sewer systems. Ventilate spill or leak area to disperse gas. Eliminate all sources of ignition. Stop flow if possible. If small spill, either allow it to vaporize or absorb the vapor in water. If large spill, spray the vapor cloud with water to reduce fire and fume hazard.
<b>Neutralizing Chemicals:</b>	Neutralization with acid not recommended. Flush area with water.

VII. Handling and Storage	
<b>Handling:</b>	Handle all chemicals with respect. Keep separated from incompatible substances. Handle only with equipment, materials, and supplies specified by their manufacturer as being compatible and appropriate for use with this product.
<b>Storage:</b>	Storage in specially designated areas outside or in detached structure is preferred. Store inside only in a cool, well-ventilated area free from combustibles and away from all sources of ignition. Protect containers from corrosion and mechanical damage. Containers should have safety relief valves. Separate from other chemicals, particularly oxidizing gases, organic materials, chlorine, bromine, iodine, mercury, and acids. Post readily visible warning signs in the storage area listing emergency measures. Water hoses should be readily available to knock down vapors from spill.

VIII. Exposure Control / Personal Protective Equipment				
<b>Component Workplace Control Parameters:</b>				
<b>Components:</b>	<b>CAS-No.</b>	<b>Value</b>	<b>Parameters</b>	<b>Basis</b>
Ammonia NH <sub>3</sub>	7664-41-7	TWA	25 ppm	as Ammonia NH <sub>3</sub> (ACGIH)
<b>Engineering Controls:</b>	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.			
<b>General Hygiene:</b>	Practice good personal hygiene after using this material, especially before eating, drinking, smoking, or using the toilet.			
<b>Personal Protection Equipment:</b>				
<b>Eye:</b>	Wear chemical goggles and face shield unless protected by a respirator with a full face piece. Do not wear contact lenses as they may trap fumes against the eyes and can make flushing ineffective.			
<b>Skin:</b>	The use of gloves, boots, and aprons impermeable to the specific material handled (for Ammonia, includes Butyl, Teflon, Neoprene, and Viton) is advised to prevent skin contact, possible irritation, and skin damage.			
<b>Respiratory:</b>	None required under normal conditions. When conditions warrant a respirator, use NIOSH approved respirator and cartridge for particulates and ammonia.			
<b>Other Protective Items:</b>	Where splash is possible, full chemically resistant protective clothing and boots are required. Ensure that eyewash stations and safety showers are proximal to the work-station location.			
<b>HMIS Classification:</b>	<b>Health (Blue)</b>	<b>Flammability (Red)</b>	<b>Physical Hazard (Yellow)</b>	<b>PPE (White)</b>
	3	1	0	See Above
<b>Hazard Classification: 0 = Minimal 1= Slight 2 = Moderate 3 = Serious 4 = Severe</b>				

IX. Physical and Chemical Properties			
<b>Physical State:</b>	Liquid	<b>pH:</b>	>13
<b>Appearance:</b>	Clear, colorless liquid	<b>Molecular Weight:</b>	35.05
<b>Odor:</b>	Pungent odor	<b>Odor Threshold:</b>	1-50 ppm
<b>Specific Gravity:(H<sub>2</sub>O=1)</b>	0.92 (19% Solution); 0.90 (25% Solution); 0.89 (30.5% Solution) @ 60°F (15.5°C)	<b>Weight per Gallon:</b>	7.74 (19% Solution); 7.58 (25% Solution); 7.45(30.5%Solution) lbs @ 60°F(15.5°C)
<b>Vapor Density: (Air=1)</b>	0.045 lbs/cf @ 60°F (15.5°C)	<b>Vapor Pressure:</b>	276 mm Hg (19%) 629 mm Hg (29%) @ 77°F (25°C)
<b>Boiling Point: at 14.7 psia</b>	81°F - 120.6°F (27.2°C -49.2°C)	<b>Freezing/Melting Point:</b>	-106°F (-77°C)
<b>Lower Explosive Limit:</b>	16% by volume Ammonia gas	<b>Upper Explosive Limit:</b>	25% by volume Ammonia gas
<b>Flash Point:</b>	N/A	<b>Autoignition Temp:</b>	1,204 °F (651°C) (vapor)
<b>Solubility in water:</b>	100%		
<b>Other:</b>			

X. Stability and Reactivity Data	
<b>Chemical Stability:</b>	Product is stable under normal or expected use.
<b>Conditions To Avoid:</b>	Heat, sunlight, incompatibles, sources of ignition.
<b>Incompatible Materials:</b>	Corrosive to copper, brass, silver, zinc, aluminum alloys, and galvanized steel. Immediately boils when mixed with acids and is dangerous. Forms explosive compounds with calcium hypochlorite, bleaches, gold, mercury, silver, chlorine, and other halogens.



<b>Hazardous products of Decomposition:</b>	Burning may produce ammonia and nitrogen oxides.
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<b>XI. Toxicological Information</b>						
<b>Routes of Entry:</b>	<input checked="" type="checkbox"/> Eyes <input checked="" type="checkbox"/> Skin <input checked="" type="checkbox"/> Ingestion <input checked="" type="checkbox"/> Inhalation					
<b>Sign and symptoms of Exposure:</b>	Burning of the eyes, conjunctivitis, skin irritations, swelling of the eyelids and lips, dry red mouth and tongue, burning in the throat, and coughing. In more severe cases of exposure, difficulty in breathing, signs and symptoms of lung congestion, and, ultimately, death from respiratory failure due to pulmonary edema may occur.					
<b>Eye Contact:</b>	Vapor is irritating to the eyes. Liquid will cause burns.					
<b>Ingestion:</b>	Ingestion causes burning pain in mouth, throat, stomach, thorax, constriction of throat, and coughing. This is soon followed by vomiting of blood or by passage of loose stools containing blood. Ingestion of 3-4 ml may be fatal.					
<b>Skin Contact:</b>	Ammonia absorption: Because of its alkalinity and water solubility, tends to break down and disrupt the outer cell layers, permitting rapid penetration. Even so, ammonia is not a systemic poison and the effects will be limited to local effects. Contact: Causes smarting of the skin and first-degree burns on short exposure. May cause second-degree burns on long exposure.					
<b>Inhalation:</b>	Ammonia vapors are highly irritating to throat at approximately 400 ppm. Causes edema, dyspnoea, bronchospasm, chest pain, pink frothy sputum. Inhalation of 500 ppm ammonia considered immediately dangerous to life and health (OSHA).					
<b>Carcinogenicity:</b>	NPT	Not Listed	IARC	Not Listed	OSHA	Not Regulated
<b>Ingredient Name:</b>	Species		Test		Period	Results
Ammonium Hydroxide	Rat		350 mg/kg		oral	LD50
<b>Comments:</b>						

<b>XII. Ecological Information</b>				
<b>Ingredient Name:</b>	Species	Test	Period	Results
Ammonia NH <sub>3</sub>	Chinook Salmon	0.45 mg/L	96 hrs	LC50
<b>Comments:</b>	Ammonia dissipates relatively quickly in ambient air and rapidly returns to the soil via combination with sulfate ions or washout by rainfall. Ammonia strongly adsorbs to soil, sediment particles, and colloids in water under aerobic conditions. Biodegradation of ammonia to nitrate occurs in water under aerobic conditions which results in a biological oxygen demand (BOD).			

<b>XIII. Disposal Considerations</b>	
<b>Waste Disposal:</b>	Always dispose of material in accordance with local, state, and federal regulations.

<b>XIV. Transportation Information</b>					
<b>Proper Shipping Name:</b>	Ammonium Hydroxide, with more than 10% but not more than 35% as ammonia.				
<b>DOT Classification:</b>	8				
<b>Identification Number:</b>	UN 2672	<b>Packing Group:</b>	III	<b>Other Labels:</b>	Corrosive
<b>Comments:</b>					

XV. Regulatory Information				
Inventory Status:		US Regulations:		
U. S. TSCA	Yes	SARA 302 TPQ	500 lbs as ammonia NH <sub>3</sub>	
Europe EINECS	Yes	SARA 304 RQ	100 lbs as ammonia NH <sub>3</sub>	
Canadian DSL	Yes	SARA 313 List	Listed	
Japan ENCS	Yes	CERCLA (RQ)	1,000 lbs for pure ammonium hydroxide	
Korean KECI	Yes	RCRA 261.33	Not Listed	
Philippines PICCS	Yes	CAA-112r (RMP)	20,000 lbs. as ammonia NH <sub>3</sub> (Solution of greater than 20%)	
Australian AICS	Yes			
		SARA 311/312	<input checked="" type="checkbox"/> Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Fire <input checked="" type="checkbox"/> Release of Pressure <input type="checkbox"/> Reactive	
International Regulations:			Other Regulations:	
Canada WHMIS	E	Corrosive	California PROP 65	No
EINECS	231-635-3	as Anhydrous Ammonia		
EINECS	215-647-6	as Aqua Ammonia		

XVI. Other Information	
NSF Certification:	Aqua Ammonia manufactured at Lake Charles, LA is NSF-60 certified. Maximum use in potable water is 10 mg/L.
Other:	_____
Revision Notes:	_____
MSDS Replacements:	<u>SII MSDS 097 AQUA-CAT® Aqua Ammonia</u>

<b>SALES OFFICE</b>		
<b>For Product Information:</b> TEL: 662-494-3055 FAX: 662-494-2828	Post Office Drawer 1217 West Point, MS 39773	<b>To Place An Order:</b> TEL: 800-953-3585 FAX: 800-953-3588
<b>IMPORTANT</b>		
Although the information contained is offered in good faith, SUCH INFORMATION IS EXPRESSLY GIVEN WITHOUT ANY WARRANTY (EXPRESS OR IMPLIED) OR ANY GUARANTEE OF ITS ACCURACY OR SUFFICIENCY and is taken at the user's sole risk. User is solely responsible for determining the suitability of use in each particular situation. SII specifically DISCLAIMS ANY LIABILITY WHATSOEVER FOR THE USE OF SUCH INFORMATION, including without limitation any recommendation which user may construe and attempt to apply which may infringe or violate valid patents, licenses, and/or copyright.		

## Appendix E

### Hazardous Insects, Animals, and Plants

## 1. Scorpions



**All Scorpions are venomous. Only about 25-30 of them have a type of venom that is potent enough to make someone very ill or to kill them. The Scorpion loves to live around rocks, sand, and trees. However, they are very adaptable and have been found living in some very unusual places. They are nocturnal and will usually stay in holes or under rocks during the day.**

First Aid (Information taken from WebMD <http://www.webmd.com/allergies/scorpion-stings>)

1. Most people will have only minor problems, like pain, swelling, numbness, and tingling at the site of the bite.
2. Use ice to bring down the swelling.
3. Take an antihistamine or use a hydrocortisone cream to relive swelling and itching.

## 2. Wasp and other stinging insects



**Wasp, bees and hornets all live in hives or combs. Their homes are always in cooler and sheltered areas, often within the shade of trees or under a roof. Bees, wasps, and hornets all proliferate in warm weather, their hives growing in the spring and early summer.**

*First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/bee-and-wasp-stings-treatment>)*

1. The majority of problems that require medical attention come from an allergic reaction to the sting.
2. Remove any stingers immediately. Some experts recommend scraping out the stinger with a credit card.
3. Applying ice to the site may provide some mild relief. Apply ice for 20 minutes once every hour as needed. Wrap the ice in a towel or keep a cloth between the ice and skin to keep from freezing the skin.
4. Taking an antihistamine such as diphenhydramine (Benadryl) or a non-sedating one such as loratadine (Claritin) will help with itching.
5. Take ibuprofen (Motrin) or acetaminophen (Tylenol) for pain relief as needed.
6. Wash the sting site with soap and water and place an antibiotic ointment on the site.
7. If it's been more than 10 years since your last tetanus booster, get a booster within the next few days.
8. Most insect stings require no additional medical care.

### 3. Fire Ants



**A typical fire colony produces large mounds in open areas, and feeds mostly on young plants and seeds. Fire ants often attack small animals and can kill them. Unlike many other ants which bite and then spray acid on the wound, fire ants bite only to get a grip and then sting (from the abdomen) and inject a toxic venom. For humans, this is a painful sting, a sensation similar to what one feels when burned by fire (hence the name) and the after effects of the sting can be deadly to sensitive people. Fire ants are more aggressive than most native species and so have pushed many species away from their local habitat.**

First Aid (Information taken from WebMD <http://www.webmd.com/allergies/fire-ant-stings#>)

1. Put ice on the sting off and on (15 minutes on, 15 minutes off). Use a towel. Don't put ice directly on your skin and don't use heat.
2. Elevate the area of the sting to reduce swelling.
3. Take an antihistamine and use a hydrocortisone cream to relieve itching.
4. If the sting is very large and painful your doctor may give you prescription antihistamines and steroids.

#### 4. Spiders

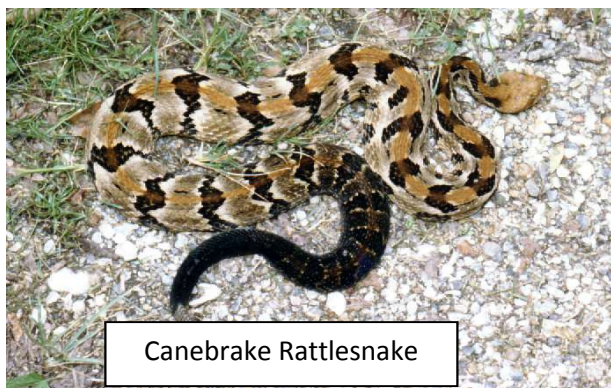


Venomous spiders use venom to kill their prey after they have captured it in their web or by other means. They can pose a danger to workers. Spiders reside in cool dark areas, often inside buildings and open/enclosed structures. If encountered, workers should avoid them.

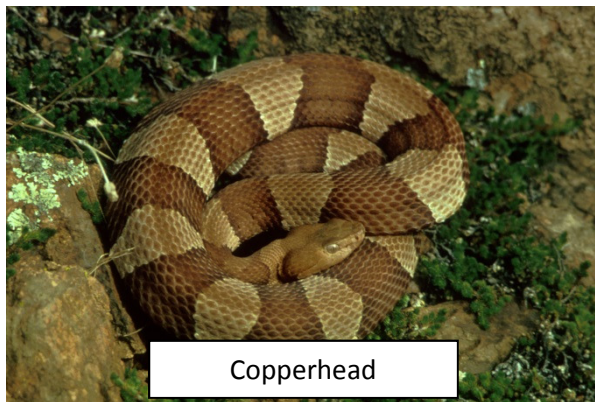
First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/understanding-insect-bites-spider-bites-treatment>)

1. For spider bites that aren't serious, the goal of treatment is simply to relieve discomfort. If the bite or sting causes a severe reaction, seek immediate medical help.
2. If you think you've been bitten by a black widow spider, seek medical help.
3. A spreading wound from a brown recluse spider bite should be surgically cleaned and repaired although surgery isn't always required. Apply cold packs but don't apply ice.

5. Indigenous Louisiana Venomous Snakes



Canebrake Rattlesnake



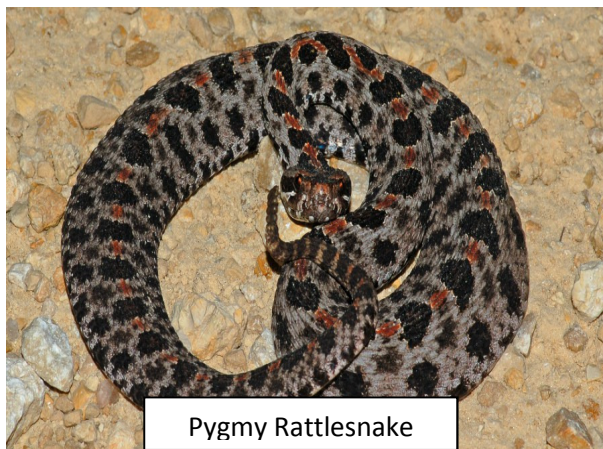
Copperhead



Cottonmouth



Eastern Diamondback Rattlesnake



Pygmy Rattlesnake



Texas Coral Snake

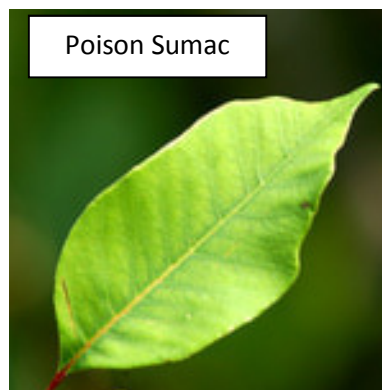
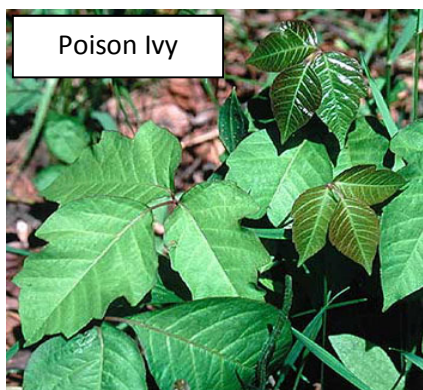
Snakes are not aggressive except when defending themselves. They do not pursue people, although they may swim or crawl toward someone they don't recognize as a threat. Venomous snakes are unable to strike a distance more than their body length, even less for large rattlesnakes. Thus, a distance of only five or six feet can be considered "safe" for any venomous snake in Louisiana. Snakes usually stay hidden under leaves, logs or heavy vegetation. All snakes should be treated as venomous. In the event you encounter a snake "Stay Away".



First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/snakebite-treatment>)

1. Note the Snake's Appearance
  - Be ready to describe the snake to emergency staff.
2. Protect the Person
3. While waiting for medical help:
  - Move the person beyond striking distance of the snake.
  - Have the person lie down with wound below the heart.
  - Keep the person still to keep venom from spreading.
  - Cover the wound with loose, sterile bandage.
4. Do not:
  - Cut a bite wound
  - Attempt to suck out venom
  - Apply tourniquet, ice, or water
  - Give the person alcohol or caffeinated drinks
5. Follow Up
6. If you treat the bite:
  - Contact a health care provider. The person may need a tetanus shot. Tetanus boosters should be given every 10 years.
7. At the hospital, treatment will depend on the type of snake.
  - If the snake was venomous, the person will be given anti-venom treatment.
  - A tetanus shot may be given, depending on date of last injection.

## 6. Poisonous Plants



**Poison ivy** - typically grows as a vine or shrub, and it can be found throughout much of North America. It grows in open fields, wooded areas, on the roadside, and along riverbanks. Poison ivy plants typically have leaf arrangements that are clustered in groups of three leaflets, though this can vary. The color and shape of the leaves may also vary depending upon the exact species, the local environment, and the time of year. The plant may have yellow or green flowers, and white to green-yellow berries, depending on the season.

**Poison oak** - grows as a vine or shrub, and it is found in the western United States. It also has a leaf arrangement similar to poison ivy, with clusters of three leaflets. The leaves may sometimes resemble true oak leaves

**Poison sumac** - grows as a shrub or small tree, and it is found in the eastern/southeastern United States. It grows in very wet areas. Each stem contains seven to 13 leaves arranged in pairs. It has the potential to cause a more severe rash than either poison ivy or poison oak.

First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/allergy-poison-ivy-oak-and-sumac-treatment>)

1. Wash Exposed Area
  - Wash with warm soap and water
  - Washing within 10 minutes can significantly reduce the chance of an allergic reaction.
2. Remove Contaminated Clothing
  - Plant oil can continue to spread from clothing and shoes.
3. Ease Itching and Discomfort
  - Apply cool compresses for 15 to 30 minutes at a time.
  - Avoid topical antihistamines, anesthetics like benzocaine, and antibiotic ointments, all of which may make skin more sensitive.
  - Have the person take oatmeal baths.

- Apply calamine lotion.
  - If itchiness makes sleep difficult, give an oral antihistamine.
4. When to See a Doctor
- Get medical help if rash covers a large part of the person's body, or if the person has blisters or can't sleep.
5. Follow Up
- Symptoms usually go away within a week or two.
  - Wash contaminated clothing to avoid exposure to oil.
  - If serious rash persists, call a doctor.

Appendix- F  
Emergency Contacts

## **Emergency Contacts**

Prior to mobilization and any activity on site, ESI will notify both local and state authorities about the nature of work conducted regarding this disposal activity. Site manager will review the emergency contacts and emergency medical treatment options prior the commencement of work operations.

<b>Agency</b>	<b>Contact number</b>
La. State Police Hazardous Material Hotline	(225) 925-6595
Col. Ronnie Stuckey-LMD	(318) 542-5624
Karen Price, LDEQ	(225) 936-8832
Greg Fife, EPA OSC Region VI	(214) 665-6773
Camp Minden MP Station	(318) 382-4171
Linda Mahon, Installation Safety Officer	(318) 382-4265 DSN 435
Local Police and Fire Medical Emergency	911

### ***Emergency Medical Treatment***

Minden Medical Center – Emergency Care

(318) 377-2321

1 Medical Plaza Place

Minden, LA 71055 (Approximately 10 miles away)

Or

Louisiana State University Health Science Center Shreveport

(318) 675-5950

1501 Kings Hwy. Shreveport, LA 71103. (Approximately 24 miles away)